Plates. { Drawings of McKim, Mead & White.
Drawings of Frank Miles, Day & Bro.
Measured Drawings Brick Gateways, by C. F. BRAGDON.

THE BRICKBVILDER

DEVOTED TO THE INTERESTS OF

ARCHITECTVRE IN MATERIALS OF CLAY

LIBRARY OF CONGRESS COPYRIGHT. AUG 29 1896 CITY OF WASHINGTON

PUBLISHED MONTHLY.

85 WATER STREET, BOSTON, MASS.

VOLVME FIVE

AUGUST MDCCCXCVI

NVMBER EIGHT

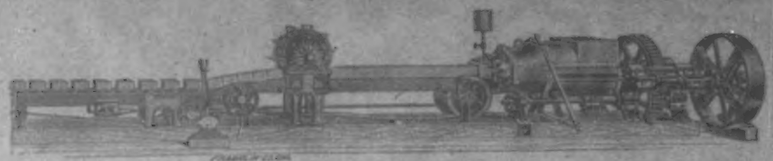
CONTENTS

		PAGE.
STONE vs. TERRA-COTTA	*Editorial*	140
ANDREA DELLA ROBBIA AND HIS ALTAR-PIECES	*Prof. Allan Marquand*	141
ARCHITECTURAL TERRA-COTTA (continued)	*Thomas Cusack*	143
REPORT OF JUDGES—BARTA PRESS COMPETITION		145
FIRE-PROOFING DEPARTMENT		
The New York Fire-proofing Tests		147
Fire-proofing Engineer	*Peter B. Wight*	147
A New Fire-proofing System		148
MORTARS AND CONCRETE DEPARTMENT		
American Cements (continued)	*Uriah Cummings*	149
MASONS' DEPARTMENT		
The Architect and Contractor. Methods of Estimating (continued)	*Thos. A. Fox*	151
Bonding of Brickwork	*A Mason*	152
RECENT BRICK AND TERRA-COTTA WORK IN AMERICAN CITIES AND		
MANUFACTURERS' DEPARTMENT		153

For Index to Advertisements see page xxxvi.

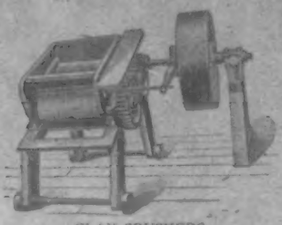
THE BARTA PRESS, BOSTON.

CLAY WORKING MACHINERY.



No. 1. GIANT MACHINE WITH AUTOMATIC TABLE.

DRY AND WET PANS.



CLAY CRUSHERS.

DUMP CARS.

THE FREY, SHECKLER CO., Bucyrus, Ohio.

Send for Catalogue.

Progressive Architects

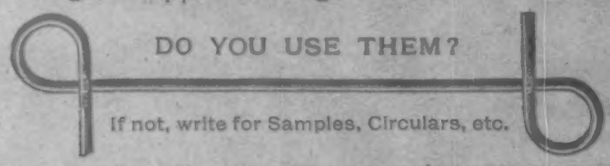
Use the.... **Morse Patent Wall Tie**

For bonding Hollow Walls, Brick Facings, etc. It is Strong and Reliable.

J. B. PRESCOTT & SON,

Sole Manufacturers,

N. Y. Office: 62 Reade Street. Webster, Mass.



DO YOU USE THEM?

If not, write for Samples, Circulars, etc.

DAY BRICK CO.,

Manufacturers of

Fine Pressed Red Brick.

SAMPLES ON APPLICATION.

WORKS AND OFFICE, BELLEVILLE, ILL.

Cream White Brick

Made by

The Brooke Terra-Cotta Co.

Lazearville, West Virginia,

Are smooth, dense, hard, and better than any so-called "white brick" on the market. They do not change color.

We can furnish

High-Grade Pressed Front Brick,

from the lightest shade of CREAM to the darkest shade of BUFF.

We were forced to turn away orders last season, but have largely increased our capacity and hope to take care of all business offered us this season.

We make the Lightest Shade Cream Brick on the market.

Brooke Terra-Cotta Co.

ROOF SHOWING NEW MODEL GUARDS.

FOLSOM PATENT ROOF SNOW GUARDS,

FOR OLD AND NEW ROOFS, SLATE, SHINGLE AND TILE.

The Folsom Method is Scientific and is displacing the Guard Rail.

Correspondence Solicited.

FOLSOM SNOW GUARD CO.,

178 Devonshire St., Boston, Mass.

The LaSalle Pressed Brick Co.,

LaSALLE, ILL.

MANUFACTURERS OF

Red, Buff, Pink

FRONT AND ORNAMENTAL BRICK.

Write for Catalogue.

The "Swinging Hose Rack,"

PATENTEE & MANUFACTURER

JNO. C. N. GUIBERT,

Room 108, 38 Cortlandt St.

NEW YORK.

SEND FOR CATALOGUE.

FOR INFORMATION ABOUT

U. S. MAIL CHUTES,

Which are a necessity in Office Buildings and Hotels, write to the sole makers

THE CUTLER M'F'G CO., ROCHESTER, N. Y.

PATENTED. AUTHORIZED.

STAINED GLASS.

Stained and mosaic glass windows executed for both churches and houses.

Correspondence Solicited.

Send for Illustrated Hand-Book.

J. & R. LAMB, 59 Carmine Street, New York.

D. J. CURTIS,

Springfield, Mass.

Circular Brick for Power Chimneys.

Ornamental Brick Made and not Assembled.

PATENT APPLIED FOR.

Merchant's Combination Skylight "Star" Ventilator...

Is not a compromise between a first-class Ventilator and a poor skylight, but the BEST OF BOTH.

HYGIENIC PRINCIPLES

are assured in a *perfect combination* of *Light and Air.* Supplies light and ventilation simultaneously. Invaluable where economy of space is necessary. Explanatory circulars FREE.

PHILADELPHIA CHICAGO MERCHANT & CO. NEW YORK BROOKLYN

INCORPORATED.

DO YOU WANT CREDIT REPORTS ON MEN WHO MAKE ON MEN WHO BUY ON MEN WHO SELL BRICK?

Trustworthy service at lowest prices; ordinarily $1.00 for each report.

DO YOU WANT RELIABLE LISTS OF BRICK MANUFACTURERS AND SUPPLY MEN IN ANY STATE, IN ANY COUNTRY?

These can be furnished at small cost, usually $1.00 for any single list.

DO YOU WANT ADVANCE REPORTS That ARE advance reports of all contemplated construction work calling for BRICK?

DO YOU WANT TO KNOW — How to sell BRICK to the Government? Where there is a good opening for a BRICKYARD? Who are the new BRICK firms and companies? What are the latest BRICK-making inventions? and a dozen other things that every BRICKman ought to know, and the knowing of which means more business and better business? Address with your latest catalogue or circular.

Commercial Intelligence Dep't. ASSOCIATED TRADE & INDUSTRIAL PRESS,

Rooms 9, 10, 11, 12, and 13, 610 13th Street, Washington, D. C.

ESTABLISHED NINE YEARS.

VOLVME V AUGUST 1896 No. 8

THE BRICKBVILDER

OFFICE 85 WATER STREET BOSTON

THE BRICKBUILDER.

AN ILLUSTRATED MONTHLY DEVOTED TO THE ADVANCEMENT OF ARCHITECTURE IN MATERIALS OF CLAY.

PUBLISHED BY

The Brickbuilder Publishing Company,

CUSHING BUILDING, 85 WATER STREET, BOSTON.

P. O. BOX 3282.

Subscription price, mailed flat to subscribers in the United States and Canada . . . . . $2.50 per year
Single numbers . . . . . 25 cents
To countries in the Postal Union . . . . . $3.00 per year

COPYRIGHT, 1893, BY THE BRICKBUILDER PUBLISHING COMPANY.

Entered at the Boston, Mass., Post Office as Second Class Mail Matter, March 12, 1892.

THE BRICKBUILDER is for sale by all Newsdealers in the United States and Canada. Trade Supplied by the American News Co. and its branches.

PUBLISHERS' STATEMENT.

No person, firm, or corporation, interested directly or indirectly in the production or sale of building materials of any sort, has any connections, editorial or proprietary, with this publication.

THE BRICKBUILDER is published the 20th of each month.

STONE *vs.* TERRA-COTTA.

THE relative merits of stone and of the burnt clay products as building materials afford perennial opportunities for discussion, and the question is often raised whether the one is better than the other. We imagine that most builders and manufacturers do not appreciate how little the question of relative absolute worth is considered by the architect or by the owner of a building, and the warmest advocates of the one material or the other sometimes seem to be oblivious to the fact that building material is influenced very largely by much the same currents of opinion and usages which affect manufactured products of other descriptions, and that the demand arises far more from natural selection and the survival of the fittest than from the efforts of salesmen or the preference of individuals. An animated and at times acrimonious discussion has of late been taking place between two of our esteemed contemporaries, one being apparently unwilling to admit that stone in any form is suitable for building operations and even going so far as to hint that when anything but terra-cotta is employed, the decision is very largely due to direct or indirect bribery on the part of salesmen or dealers in stone, while the opposing journal more temperately denies the likelihood that either the terra-cotta or the stone men can bribe their goods into approval, but maintains that the only reason why terra-cotta is ever used in place of stone is because it is cheaper.

Now, without wishing to enter upon a discussion of this subject, we feel that there are very tangible reasons for our belief in the worth and desirability of the burnt clay products as building material. Many of our readers will remember the architectural throes of the period immediately following the Centennial Exhibition, when this country was beginning to awake to the fact that we had no architecture, although possessing high creative possibilities. For a time everything was designed in the Gothic style. We had Eastlake chairs, Gothic store fronts, Gothic shingle palaces, and our designer seemed to feel that one style and one method of construction would answer every purpose. Fortunately, the years have brought a wider range of professional discretion, and the intelligent designer of to-day endeavors to adapt the style to the purpose of the building, and within certain vaguely defined limits to permit himself a latitude in the choice of architectural expression. Exactly the same latitude is expected in the choice of material. While we believe that the burnt clay products are the best and the most suitable for nearly all structural purposes, there are cases where nothing but stone can be used to the best advantage. There are other cases wherein iron or concrete is the proper material to use, and the fact that the burnt clay industries have increased to the extent we now find them is due very largely to discrimination on the part of our architects, and the attempt persistently repeated to use materials in a proper, consistent, and well-advised manner. Brick cannot do everything, and terra-cotta does not fill every need. We can say this without the slightest derogation of its intrinsic as well as extrinsic advantages.

THE points peculiarly in favor of brick and terra-cotta as constructive materials are manifold. Brick is easily handled, requires little effort to put in place, can be readily repaired or altered, adapts itself to irregular contours, as well as to solid, massive construction, is absolutely fire-proof, and when properly made is impervious to the effects of the atmosphere. Terra-cotta, more than any other material, receives directly the touch of the artist. It can be molded into any shape with the greatest ease; it retains all the individuality of the designer, and, like brick, can be set with ease in any position. On the other hand, if we look over the building stones which are now in the market, there are hardly more than two which, in point of mere durability, can compare with thoroughly burned terra-cotta or brick. Only the best of the granites, and the Georgia marbles from the Tuckahoe quarries, can be entirely depended upon for all time. We know that sandstone disintegrates with time, and that limestone is affected by atmospheric acids, and no stone has yet been found which can be deemed to be safe against the action of extensive heat. This is recognized in some of the building laws of this country, which provide that wherever a stone pier is built below the grade of the street, it must be protected by a casing of fire-proof material, preferably of brick.

THE most rabid opponents of brick admit that the use of terra-cotta, iron, and other materials in the construction of buildings has increased, while in many places the use of stone has been at a standstill. The recent developments of skeleton construction could not have been brought about except for the possibilities of brick and terra-cotta. While stone is used a great deal in connection with the steel frames, every constructor and architect knows how difficult it is to make a thorough tie with stone about the structural members, and how doubtful the fire-proofing results are. On the other hand, brick fits into the webs and angles of the steel work, thoroughly protecting it, strengthening the whole by the cohesion of the parts,

and at the same time permitting an amount of detail in design and decoration which, while it might be accomplished by the use of stone, would be much more expensive in the latter material and would certainly look no better. It must be remembered that the manufacture of thoroughly first-class terra-cotta is comparatively a modern achievement, and that while stone has been used in the best manner for centuries, we have only lately learned how to preserve a high grade of constructive excellence with wide range of artistic possibilities in the burnt clay products; and the fact that the use of terra-cotta and brick has steadily increased, in spite of the numerous failures which have had to be reported at times, and notwithstanding the quantities of poor bricks, soft terra-cotta, and positively bad workmanship which have been inflicted upon a long-suffering community, ought to be sufficient evidence that without any derogation to the artistic and practical uses of stone as a building material, the burnt clay products must have a great deal more to recommend them than the mere cheapness in first cost.

WE must take exception to the inference drawn by one of our contemporaries that the stone buildings in the path of the tornado in St. Louis withstood the effects of the storm better than the brick structures. As a matter of fact, the tornado nowhere encountered any of the modern structures. The buildings destroyed were mostly cheap affairs, which could hardly be depended upon for ordinary emergencies. But if it came to an actual test, as between two modern steel skeleton buildings, one constructed with a facing of stone, the other with walls built throughout of brick or terra-cotta, the work in both cases being first class in every respect, a tornado such as occurred at St. Louis would undoubtedly wreck both; but the greater flexibility of the brick construction, as well as the fact that it ties and knits so thoroughly into the steel framework, would probably enable it to withstand an amount of wrenching which would shake off every particle of stone from the front of the other structure.

The fact is, the extended use of the burnt clay products has arisen as part of the enormous expansion of building through which this country has passed during the last quarter century, and brick and terra-cotta most fully answer our modern requirements. No one can dispute the artistic qualities nor practical advantages of stone, but its relative desirability as compared with terra-cotta is best gauged by a survey of recent architecture in any of our large cities, where a building completely of stone is the exception rather than the rule.

BUILDING CONSTRUCTION AND SUPERINTENDENCE.

By F. E. Kidder, C. E., Ph. D., Architect. Author of "The Architects' and Builders' Pocket Book." Part I., Masons' Work. Price, $4. New York: William T. Comstock, 23 Warren Street, 1896.

IT is a difficult task to create a compendium of building construction if it is to be much more than local in its application, as the practise of building varies in many respects in different parts of our country; but Mr. Kidder has nevertheless managed to collect an exceedingly valuable mass of information relating to the general subject, which is put in such form as to make it immediately available for the purposes of architect and superintendent. The author's point of view is nearly always that of the architect rather than that of the contractor, but his deductions are none the less valuable on that account. The first volume, having to do entirely with mason work, includes a little over four hundred pages, accompanied by two hundred and fifty illustrations, and very thoroughly describes the different parts of the subject, dealing with foundations, limes, cements, and mortars, building stones, brickwork, terra-cotta, fire-proofing, steel work, lathing, and plastering, and concrete, with a very good chapter on specifications. The chapter on fire-proofing is especially good, taking up the subject thoroughly and illustrating the best developments thereof in the clear, concise manner which is characteristic of Mr. Kidder's work. He quotes very copiously from a mass of authorities all through the book, which, while making the work less personal, also increases its general value. Taken as a whole, this volume is the best treatise on the subject which has yet appeared in print, and comes nearest to being complete in its field.

ILLUSTRATED ADVERTISEMENTS.

THE four terra-cotta figures that emphasize the salient angles of the tower on the Siegel-Cooper Building, Sixth Avenue, New York, are each made in one piece. They are 5 ft. in height, and weigh 1,400 lbs. each, but were taken from the kiln without a flaw of any kind. Our illustrations show two views of the same figure. They were modeled by Mr. L. Rochette, one of the staff of the New York Architectural Terra-Cotta Company, by which firm the whole of the terra-cotta used on this building was supplied.

In the advertisement of Charles T. Harris, Lessee of the Celadon Terra-Cotta Company, page xxvi, is illustrated the new residence of Justice H. B. Brown, at Washington, D. C., W. H. Miller, architect.

The Public Library, Boston, is the subject for this month's illustration, in the advertisement of the Boston Fire-proofing Company, page xii.

A view of the Munsey Magazine Building, now being erected at New London, Conn., showing the Guastavino system of fire-proofing, is shown on page xiv.

In the advertisement of F. B. Gilbreth, on page xxxv, three interesting views of details of the Lanesboro Gables, Roxbury, Mass., are shown.

The foundation course of this building is of Weymouth Seam Face Granite, furnished by Mr. Gilbreth. The effect of this material when used in this connection with brick is very clearly shown in the illustrations.

Messrs. Charles E. Park and Ralph E. Sawyer, of Boston, are the architects of the building.

THE selection of the fifteen designs for which special prizes were offered in the Barta Press Competition had not been completed at the time of our going to press. The reason for this may perhaps be better understood when it is known that over two hundred designs were submitted in this competition.

PERSONAL.

MESSRS. BELDEN & HIGGINSON, architects, Chicago, have moved their offices to 1001 Monadnock Block.

MESSRS. ROBERT BURCH AND LOGAN FELAND, Owensboro, Ky., have associated themselves under the firm name of Burch & Feland, for the practise of architecture. Catalogues and samples desired.

Andrea Della Robbia and His Altar-pieces.

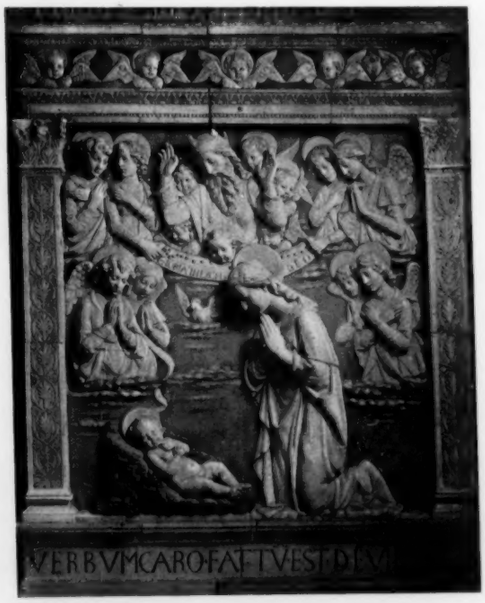
BY ALLAN MARQUAND.

OF the general characteristics which distinguish the work of the later members of the Robbia school from that of the elder Luca, perhaps the most striking is the extensive production of terra-cotta altar-pieces. It is a significant fact that we have no record of an altar-piece made by Luca della Robbia, and that Vasari, at the very beginning of his account of Andrea della Robbia, enumerates a number of altar-pieces as examples of his work. The meaning of this is that the new art of glazed terra-cotta, after having served

FAIENCE ALTAR-PIECE, "THE ANNUNCIATION," AT LA VERNA.

architecture in a decorative capacity and having established its position in the field of independent sculpture, began now to encroach upon the sphere of painting. Or, if you choose, we may state the case from another point of view, and say that the essentially pictorial spirit of the Renaissance now began to pervade the sphere of sculpture. Painted panels and canvases did not suffice for the demands of remote monasteries and country churches. They required constant care and attention to preserve them from the injuries of the atmosphere, whereas a glazed terra-cotta altar-piece was proof against such injuries and required little or no care. One need not, however, be an expert to be able to see that in the matter of glazes there were great differences even in the Robbia school. All of Luca's work seems to have been glazed to perfection. Even that which remains out of doors has preserved its glaze to the present day, whereas the less perfect glazes used by Andrea and his school are of more perishable quality. Sometimes we see that the glaze has scaled off in large masses; sometimes we may rub it off by gentle pressure of the hand. It is sad to believe that this family secret, as it is usually considered, began to be lost even during the lifetime of its supposed inventor. Similarly, if we should take up one by one the other artistic qualities of the work of Luca, and trace them after his death in the works of the school, we should have in almost every instance the story of a decline.

It is by no means an easy matter to obtain a consistent and satisfactory notion of the work of Andrea della Robbia, since the monuments which may be dated by documentary evidence belong exclusively to the later years of his life. At that time he required the assistance of his sons, and at least five of them followed their father's profession. It is reasonable to suppose that the best work of Andrea della Robbia would have been done before 1482, that is to say, during the lifetime of his uncle. And if we examine the series of works ascribed to him, a certain number, especially altar-pieces, may be set in the early class. These altar-pieces are found chiefly at Arezzo and La Verna. Vasari mentions some of them by name, and as he was a resident of Arezzo and personally acquainted with Andrea della Robbia, it is difficult to question his testimony. He mentions first the marble altar-piece at Ste. Maria della Grazie, a monument which is certainly in Andrea's later, not in his early manner. Next he mentions the altar-piece in the chapel of Puccio di Magio in St. Francesco, which in all probability is the highly polychromatic altar containing the Puccio coat-of-arms, and now in the cathedral. This altar-piece is probably earlier than the marble altar-piece at Ste. Maria della Grazie. It is a huge Conversazione or madonna and child enthroned between saints, like one of Giovanni Bellini's canvases transferred to glazed terra-cotta. Vasari enumerates more monuments, apparently at haphazard, but he seems here to have mentioned first the later works and then the earlier ones, perhaps the order of his personal preference. The charming Madonna sheltering the people of Arezzo, in Santa Maria in Grado, cannot be far removed in date from the lunette (dated 1489) over the door of the cathedral at Prato. About the same date may be assigned to the large Crucifixion altar-piece — the altar-piece at Arezzo — which formerly belonged to the Campagnia della Trinità. To Arezzo the student must certainly go if he wishes to secure a fair notion of Andrea's work. But if he wishes to see still finer products, he must make the pilgrimage to La Verna. Situated on a lofty mountain, here is one of the few monasteries in Italy which has not been suppressed. Evident prosperity reigns in this oasis amid barren hills. We may with comfort think of St. Francis and of his cave-dwelling as we walk over the spot where he is supposed to have received the *stigmata*. The church and its various chapels is rich in Robbia monuments. Some of them are late school products, and one catalogued with the Robbia monuments by Cavallucci and Molinier (No. 329) is actually signed Graziani, 1807. But the altar-pieces of "The Annunciation," "The Adoration," "The Crucifixion," "The Ascen-



FAIENCE ALTAR-PIECE, "THE ADORATION," AT LA VERNA.

sion," "The Madonna of the Girdle," and the figures in niches of St. Francis and St. Anthony are worth going a long way to see. In all these we can feel the inspiration, if not in some cases the actual handiwork, of Luca himself. "The Annunciation" angel reminds us of the

candelabra-bearing acolytes in the old sacristy of the cathedral at Florence, and the group of apostles in "the Ascension" takes us back to Luca's "Ascension" relief in Florence. There are many details, such as the refined design, the modeling of the draperies and the hair, the treatment of the eyes, the character of the inscriptions, which remind us so of Luca as to raise the question whether, after all, Vasari can be right in ascribing these monuments to Andrea. The same high quality is seen in the altar-piece at Gradara Rocca. Here the framework is somewhat conventional and repeats the motives used at La Verna, but in the painting of flowers in the predella Andrea shows the freedom of design which we admire in Luca's works. In his compositions, however, Andrea tends to become more and more conventional, and to value symmetry and balance above naturalness. One of the most charming altar-pieces of this early period is the "Coronation of the Virgin," in the Osservanza, near Sienna.

FAIENCE, LUNETTE, NOW IN VESTIBULE OF THE ACCADEMIA, AT FLORENCE.

From the year 1489 until 1515, the works which emanated from the workshop of Andrea della Robbia seem to have been very numerous. The lunette of the Madonna worshiped by two angels, now in the Opera del Duomo at Florence, is not a work of special merit. Yet the cathedral archives tell us that Andrea made it and received for it twenty florins. The lunette of the cathedral at Prato, on the other hand, which bears the date of the same year, is a work of real charm. The date is too late for us to think of Luca, but the style and handling of the work show us that Andrea did not leave this work to his assistants.

It is usually assumed that Andrea worked exclusively with white figures against blue grounds. This, however, is far from being the case. At Arezzo, besides the altar-piece mentioned by Vasari, we may note a polychromatic statue of St. Peter, martyr. At Borgo San Sepolero there are figures of St. Benedict and St. Romualdo, splendid examples of Andrea's best work. The lunette which we here reproduce of a madonna and child between St. Francis and St. Ursula, now in the vestibule of the Accademia at Florence, is certainly in the style of Andrea and yet is highly polychromatic. So are also the medallions on the loggia of St. Paolo. In 1505, Andrea was paid fifty gold ducats for the lunette of the madonna and child with angels, over the portal of the cathedral at Pistoja. We begin to see here that the hand of Andrea is growing feebler, but he is still an able sculptor, as we may judge by the somewhat monotonous but finely modeled ceiling for the porch of the same cathedral. Two years later, as recently discovered documents tell us, he made the lunettes at Ste. Maria della Quercia at Viterbo. In these he seems to have been touched by the Umbrian fondness for sentimental attitudes. His simpering saints and angels have lost much of the Tuscan grace and dignity that characterized the work of his earlier years. But this seems to have been a submission to the prevailing taste, for his bust of Almadianus, preserved in the museum at Viterbo, is not lacking in simplicity and dignity. The records at the church at Pian di Mug

FAIENCE BUST OF ALMADIANUS.

none, outside of Florence, tell us that that church once contained figures by his hand representing "the Nativity." These seem to have been statues in the round, not figures in relief, and were polychromatic — an interesting example of the influence of similar Northern groups upon Tuscan sculpture. In the Ashmolean Museum, at Oxford, there are three unglazed heads classed as from this group, but we fail to see in them any trace of the style of Andrea della Robbia.

As compared with his uncle, Andrea was less inspired and less natural in his conceptions, and did not carry to the same degree of perfection either the art of modeling, glazing, or coloring. Nevertheless, if we may assign to him such an altar-piece as that in the Osservanza at Sienna, or such a lunette as that at Prato Cathedral, Andrea may be said to have surpassed his uncle in rendering grace and charm and the milder virtues.

FAIENCE ALTAR-PIECE, AT GRADARA ROCCA.

Architectural Terra-Cotta.

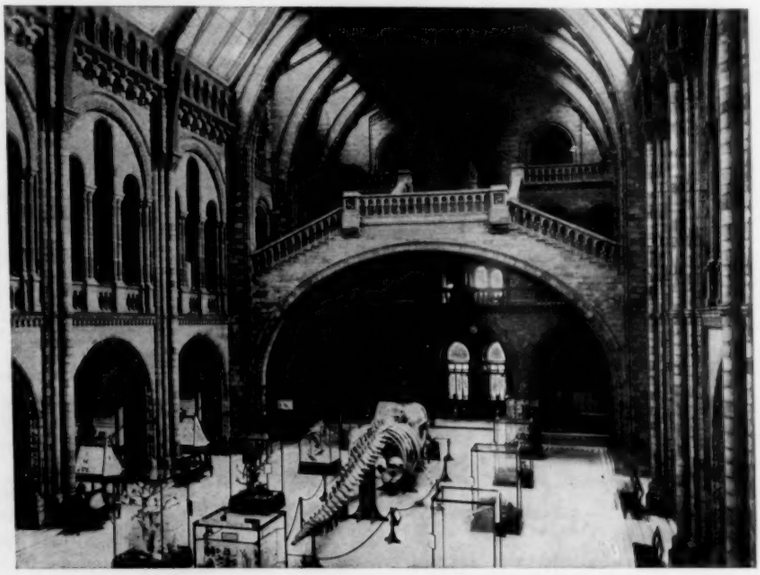
BY THOMAS CUSACK.

(*Continued.*)

A RECENT visit to the Natural History Museum confirmed the recollection of former ones made during its erection, and shortly after its completion. It likewise revealed many features of merit not previously observed, or, if seen at all, were not at that time sufficiently understood to be fully appreciated. The first and last impressions were like a young man's first reading of Shakespeare, compared with the oft-renewed studies of his riper years. Not the slightest suggestion of decay or deterioration is anywhere to be seen, and its freedom from extraneous discoloration is very remarkable. The deeply recessed windows, it is true, have received a share of the all-pervading smoke from the chimneys of over five million people, but the more exposed surfaces remain as clean and bright as when first built. The burning having been carried to the point of vitrifaction, the blocks were rendered practically impervious to dirt, and all that falls upon the face is washed off every time it rains. A man with a hose, and the occasional expenditure of a little water around the reveals and soffits of the arches, is about all that is necessary to make this the most cheerful public building in London.

The absolute uniformity of color, now so much talked of as the *sine qua non* of terra-cotta, was evidently not sought after on this building. We doubt whether it was desired, even if it could have been obtained; but whether intentional or otherwise, the blocks are *not* of uniform color. There can be no doubt that this, among other exigencies inseparable from the manufacture of terra-cotta, was taken into account when the selection of that material was being decided upon, for, in the present instance, the variation in color has been made to contribute towards a really picturesque effect. It was ever so with men of masterful mind. The most adverse circumstances have frequently been made to yield a positive advantage, not only in love and war, but in the prosaic, though hardly less heroic, pursuit of architectural terra-cotta treatment. Comparatively small-minded men have been known to work themselves into a state of anxiety bordering on frenzy on account of "uniform color," and often to the neglect of far more important considerations. We have seen much feverish excitement, and a corresponding waste of nervous energy on this point, in the case of a congeries of ordinary dwellings in New York City, or even on a commonplace block of apartment houses in a side street. Mr. Waterhouse did not fret his soul over this bugbear, though his great project was one of the first magnitude. He did not expect to receive in *terra-cotta* that which he was unable to obtain in stone, and which we in America cannot always secure in marble. Yet in the one case the architect was a distinguished academican, and in the other, perhaps an amateur builder, or a tenement-house speculator whose commercial instincts were the only ones that had reached normal development. It was one of this class who, having come into possession of a fine piece of antique furniture, sent it to a cabinet-maker to have it scraped, sand-papered, and repolished, and as he himself described it, made to look "spic-and-span." These men are really color-blind in an artistic sense, and their ideal happiness is only reached when they have obtained a lifeless, characterless uniformity at the cost of a glossy coat of lead paint. An evenness of color approaching that of stone is, of course, desirable, provided it "o'erstep not the modesty of nature," but this can be obtained by legitimate means, and in a way that is permanent, without the use of paint, or any of the empirical devices resorted to by latter-day alchemists.

The present method of slipping by means of compressed air had not been perfected when this work was being made, and the questionable expedient of *dipping* the blocks into a slip has never been encouraged by English architects. In the case under notice everything of that kind was expressly prohibited, and beyond a fluctuating tinge, that bears evidence of thorough, and occasionally of excessive firing, the surface is part and parcel of a homogeneous body. Its beauty is more than skin deep, and is not due to the "treatment" of Madame Recamiers' on the one hand or house painters on the other. From present appearances, it must be some time yet before Macaulay's New Zealander comes to sketch the ruins of the world's metropolis as seen from the remaining arch of London Bridge. But however graphically he may draw the condition of chaos into which a degenerate race must then have fallen, he will not have to record the "peeling off" of the slip, or the disintegration of these honestly made and solidly filled blocks of masonry. As already stated, and as may be expected, there is a wide range of color between the lightest and darkest blocks, if selected and placed in juxtaposition. But their distribution, though obviously accidental, is so regular in its irregularity, that when associated with others of medium tint, no extensive patches, and no studied patterns remain to mar what is now a really charming ensemble. The ashlar walling has the advantage of being jointed into relatively small blocks, and when viewed in connection with the immense scale of the building,[1] the individual components become more inconspicuous, and in a measure cease to assert any independent existence. The broad, general effect is a warm shade of buff, with bands and alternating voussoirs in dark gray, beyond which, one becomes conscious only of a subtle scintillating flicker of light and shade. The softening influences of time are making themselves felt, the laws of nature are lending a helping hand, and the harmony produced by the blending of varying tints is becoming



VIEW IN THE NATURAL HISTORY MUSEUM, LONDON.

[1] By a typographical error in the June number, the frontage on Cromwell Road was given as 172 ft. It should have been 672 ft.

as agreeable to the eye as that of a well-trained orchestra is to the ear.

To the firm of Gibbs & Canning, of Tamworth, is due the credit for intelligent and well-sustained efforts displayed in the manufacture of this unsurpassed specimen of terra-cotta. It has been said that so far from realizing a fortune, they, in fact, expended one, in a conscientious endeavor to supply the architect, and the not less exacting British public, with the best that skill, perseverance, and unstinted outlay could produce. The original proprietors of these works are, we believe, all dead, and so cannot benefit from posthumous advertisement. But the firm, which is still in existence, though now in other hands, values the name of "Gibbs & Canning." There is, after all, something in a name; and the good reputation which these men earned by an unflinching fulfilment of their contract was evidently not interred with their bones.

Of the numerous important buildings on which terra-cotta has been used with marked success, and which owe their existence to Mr. Waterhouse during the past twenty years, we cannot give a full list, much less attempt a detailed analysis. The Town Hall, Hove, and the Hotel Metropole, Brighton; the City Guilds Technical Schools, Exhibition Road; the Prudential Assurance Building, Holborn Viaduct; and the Weigh-house Chapel, Duke Street, London. These representative buildings will be sufficient to show that terra-cotta has been deliberately chosen in preference to stone, in work of the highest class, and the results obtained will prove the adaptability of that material, as well as the versatility of the architect's treatment.

WEIGHHOUSE CHAPEL, DUKE STREET, LONDON.

Let it not be supposed from this generalization that there is a single hackneyed repetition among them. The active, and apparently inexhaustible, brain of the man who conceived them, and watched over their growth as a father over his children, does not need to use the same set of ideas a second time. Whether built for national, municipal, commercial, or ecclesiastical purposes, and whether inspired by Norman, by Gothic, or by Renaissance precedents, the rendering is free, but not extravagant, progressive without being revolutionary, and art goes hand in hand with utility. Each one of them has its own individuality, growing out of its own plan, conforming to certain known wants, and indicative of a specific purpose. The one thing that does not change is the evident and unfailing mastery which the architect exercises over his material. Of all other members of his profession — and by their work we are acquainted with a great number — his practical knowledge of terra-cotta appears the most "extensive and peculiar." Whether this comes to him intuitively or otherwise we know not, nor do we presume to inquire. It is sufficient to know that he has it in full measure, and that it is the real secret of his remarkably successful results.

This knowledge, of course, becomes all the more serviceable from being interwoven with an unusually wide and varied experience as an architect and the creative genius of a true artist — a combination rarely met with in the same man, and one to be prized in proportion to its apparently increasing rarity. But whether as gifts or acquirements, these qualities afford him facility, discrimination, and decision in the unfettered use of a material in which success or failure depends, in an exceptionable degree, upon the use that is made of it. It is for this reason that we regret the present limitations of space, and the comparative inadequacy of the illustrations. The subject certainly calls for a fuller consideration, with special reference to these and other buildings, which would be of an educational value as object lessons.

As it is, we have been obliged to confine ourselves chiefly to the one admirable and enduring example cited in a previous chapter. But as the greater includes the less, so let it be with the Natural History Museum. In it all the others are concentrated, and in a measure typified, and in it the personality of the architect seems so indissolubly associated with his work, that we cannot think of the one without recalling the existence of the other. We hope, however, that what has been said may give rise to further inquiry, and perhaps lead to an inspection of the buildings themselves by a greater number of those interested in the use, or engaged in the manufacture of terra-cotta. We can assure those to whom these remarks are addressed; whether architects, draughtsmen, or architectural clay-workers, that a critical analysis of the examples which have been quoted would be to them a liberal education. In this particular line of study it would be but another way of casting bread upon the waters, to be found again in many days.

In tendering this advice, let it not be supposed that we are seeking to uphold the doctrine of any man's infallibility, or asking them to accept as gospel truth everything that may be seen, even in work of the most unmistakable merit. Still less would we suggest anything tending in the direction of mere slavish imitation. Literal, flagrant, and unabashed copyism is already too prevalent amongst us. Not only do we steal from the living and the dead, but what makes these sins more heinous, good things are too often spoiled in the stealing. Every calling has its quota of Pecksniffs, but offenses of this kind are not confined to that class, nor are they sufficiently discountenanced by architects of otherwise respectable standing. On the contrary, they are systematically practised, and reduced to a sort of office routine by architectural bureaus claiming a high professional reputation. There is, however, such a thing as the legitimate study of *modern* as well as of ancient examples, and in this the efforts of contemporary workers should not be overlooked. Instances of what to do, and how to do it, as well as what to avoid, and how not to do it, abound on every hand. To an eye accustomed to discriminate, the negative side is quite as instructive as the positive. A candid comparison between one's own efforts, and those of fellow-workers engaged on similar problems is also useful. Though not always conducive to self-esteem, it is none the less a safe guide,

and an inexpensive way of fixing a broader and higher standard of excellence.

The vexed question of jointing and of construction applicable to terra-cotta will be treated specifically in subsequent chapters, but before passing from this building we cannot do better than direct attention to it, as affording in this respect a number of practical examples that have few equals. The adjoining reproduction of recent photographs, taken by the writer, will show, among other things of interest, that no attempt has been made to conceal the joints. Neither have they been unduly emphasized, but frankly treated as a necessity, and recognized as a legitimate feature in the design. Even in the interior of the building the joints are a full quarter of an inch, and though viewed in trying contrast with adjacent cabinet-work, etc., the effect is all that could be desired.

(*To be continued.*)

BARTA PRESS COMPETITION. JUDGES' REPORT.

THE Designs for Borders sent in competition for the prize offered by the Barta Press are disappointing, inasmuch as they show very little actual knowledge of the first principles of blocking out and composition of designs for borders or belts.

Borders and belts are but little advanced beyond the most rudimentary types of design. The possible motives that can be used in them are comparatively few, and the value of the design is proportionate to the skill with which these motives are developed.

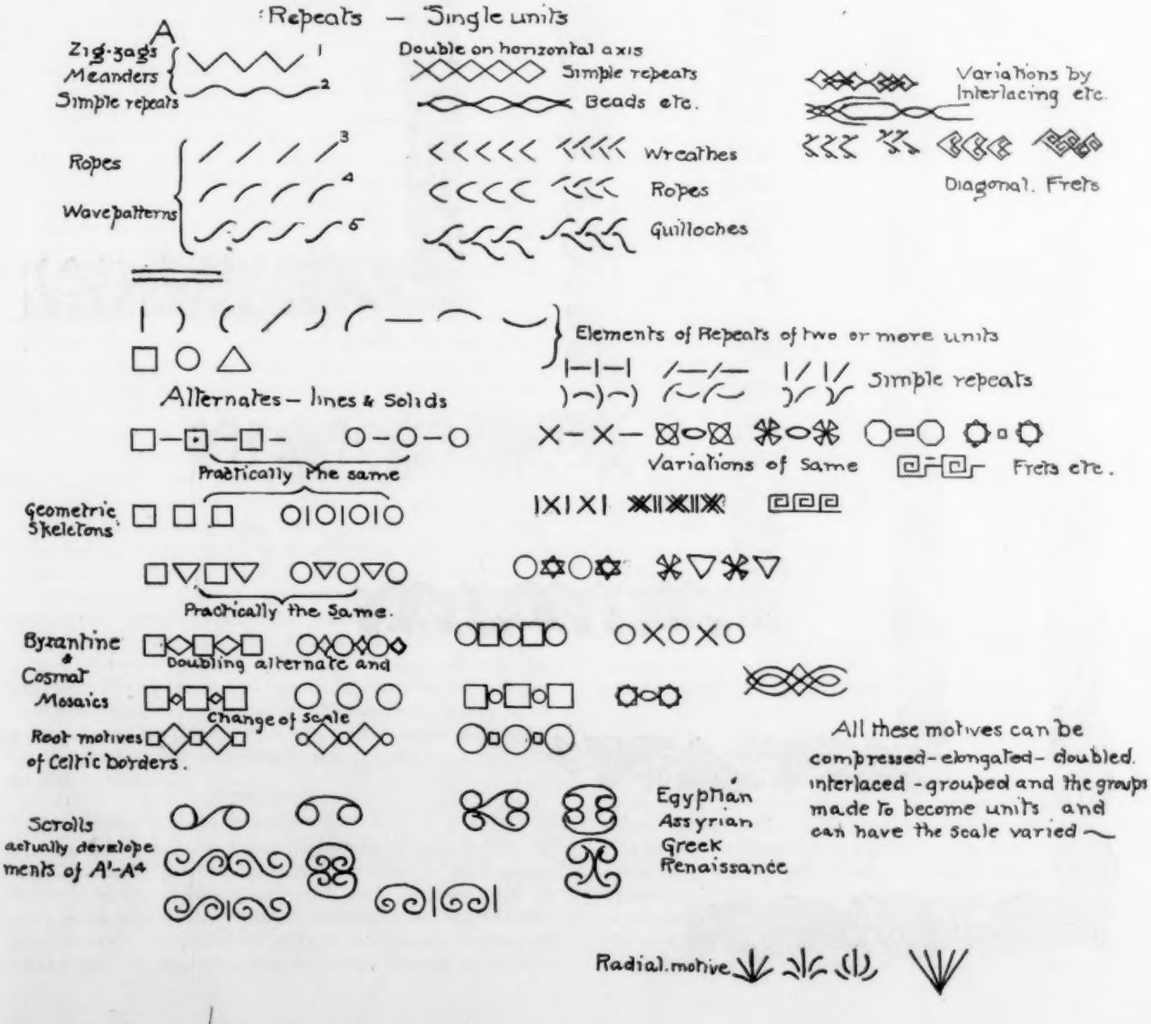
The following root schemes will be found to exhaust the possibilities of border motives which is really a subdivided triangle, and the possibilities for simple border design schemes are exhausted.

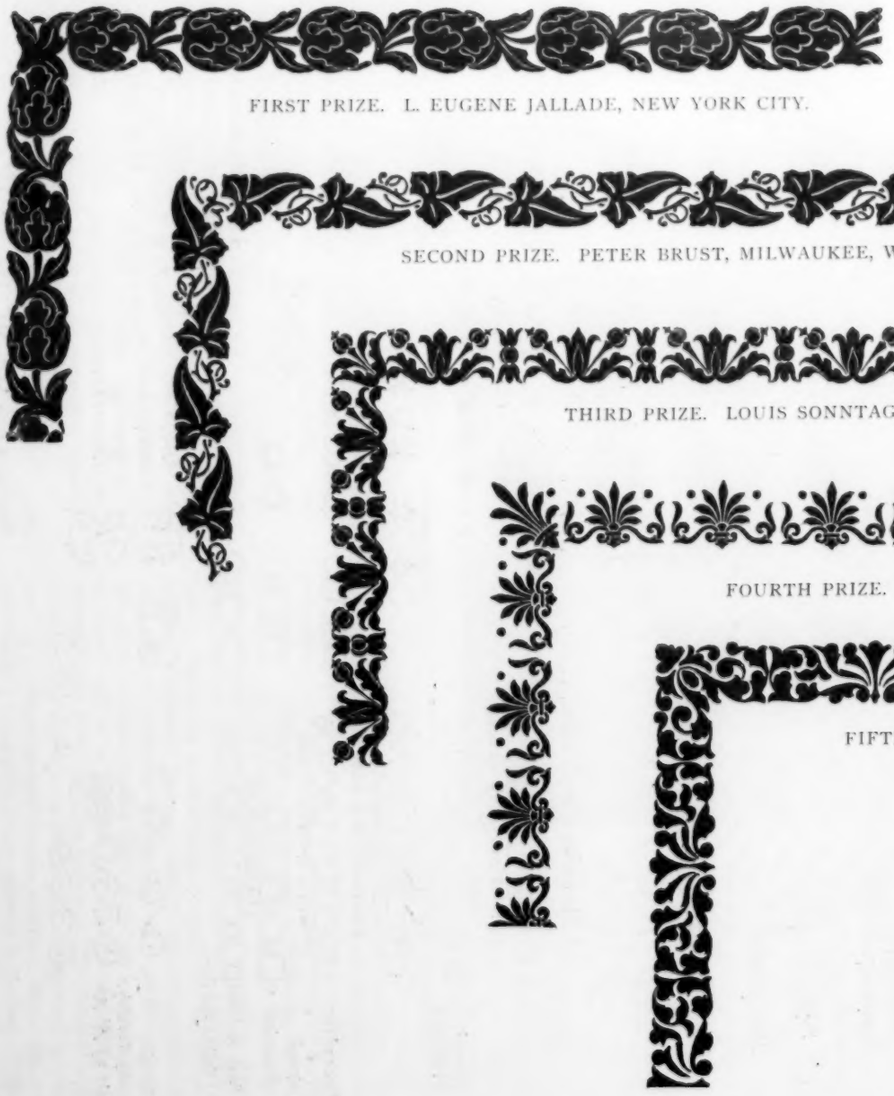
Very few of these motives, however, appeared in the designs submitted, and no facility in the use of these elements of design appeared.

And the possibilities of further development of border designs beyond these mere rudiments do not seem to have occurred to the designers. Contrast has been ignored, auxiliary parallel borders neglected, and parallel borders which occasionally approach each other and knot together, forgotten.

The units used are in most cases of the most ordinary description, without character of line or mass. By far the largest proportion of the designs are monotonous. No evidence is shown of knowledge of the very beautiful border designs of Byzantine work, of the designs during the early days of wood engraving, and of Celtic borders. There is no single design that has rich quality, and very few that are more than impoverished. It is admitted that many of these designs are better than those in use in presswork, but none of them are worthy of the prizes offered.

C. HOWARD WALKER,
R. CLIPSTON STURGIS,
BERTRAM G. GOODHUE,
Committee.





FIRST PRIZE. L. EUGENE JALLADE, NEW YORK CITY.

SECOND PRIZE. PETER BRUST, MILWAUKEE, WIS.

THIRD PRIZE. LOUIS SONNTAG, PHILADELPHIA.

FOURTH PRIZE. FRANCIS S. SWALES, ROCHESTER, N. Y.

FIFTH PRIZE. ALFRED F. SHURROCKS, PROVIDENCE, R. I.

PRIZE DESIGNS.

BARTA PRESS COMPETITION.

Fire-proofing Department.

Conducted in the Interest of Building Construction to Prevent Loss by Fire.

THE NEW YORK FIRE-PROOFING TESTS.

OUR readers will remember that some time since, through concerted action from several sources, it was arranged to have a series of tests of fire-proof material, in New York City. The conduct of these tests was placed in the hands of a committee including representatives from the Architectural League, the Tariff Association, and the American Society of Mechanical Engineers, to which were later added an advisory board, including a number of the best-known architects, engineers, constructors, and insurance men. The committee has recently presented its report of the first series of tests, which were made upon five columns, each from 12 to 15 ft. long, one column being built up of two steel channels and two plates, with a combined sectional area of 15 ins.; another being built up of four steel Z's and a plate, while the last three were of cast iron. For the purpose of the test, a brick furnace about 12 ft. square was built, the several columns being placed erect within it and subjected to a pressure from an external hydraulic ram so as to reproduce somewhat the conditions of load as they occur in practise. The furnace was heated by gas and free naphtha to temperatures varying from 1,000° to 1,300°. The columns were exposed directly to the heat without any fire-proofing whatever, the first column, composed of channels and plates, failed by crumpling after an exposure of thirty-five minutes to the high temperature with a load of less than half its safe carrying capacity. The yielding, however, took place almost as soon as the metal began to show red. The Z-bar column was exposed to the heat of from 1,000° to 1,375° for eleven minutes under very nearly its full safe load before the metal yielded by crumpling. Of the cast-iron columns, one sustained about its full safe load for thirteen minutes and another for seventeen minutes without bending. The last column tested was repeatedly heated to over 1,000°, and then cooled by water being thrown on it, the column all the while sustaining nearly its full load. It finally yielded, after about seven minutes' exposure to a temperature over 1,000°. The cast-iron columns were 8 in. diameter, of 1 in. metal, and judging from photographs of the test, yielded by bending, as a whole, a little below the center, the fourth column fracturing where the lateral deflection was the greatest. These tests were not made by the committee with a view to determine the fire-resisting qualities of steel and iron so much as to serve for a basis of comparison with subsequent series of tests. Tests of this kind made upon the bare metal are not of very great constructive values, as such conditions would hardly ever occur in a properly constructed building. Still the results are of considerable comparative interest, and they seem to show that the strength of either steel or iron is not materially affected so as to fall below its safe resistance until the temperature is raised above 1,000°, and that the metal can be trusted not to yield with a load of about six tons per inch until it becomes heated to dull redness.

Three subsequent series of tests have been arranged for by the committee; first, of unprotected beams and cast-iron columns protected with different materials and in different ways; second, of unprotected beams and girders; third, of protected beams and girders. It is also proposed that each series be provided with tests, both with and without water.

TO THE EDITOR OF THE BRICKBUILDER:—

Your article entitled "Expert Fire-proofing Engineers," in your April number, has just been brought to my notice. I am surprised that any American architect should send you a communication (on which your article is based) "calling attention to the fact that there is no generally recognized authority in this country on fire-proof construction, and suggesting that an expert fire-proofing engineer would not only fill a long-felt need, but would find ready employment for his talent in connection with our large commercial buildings," and I am equally surprised at the conditions you give for the qualifications of such an expert.

My first surprise is that any architect should ever have waked up to make the inquiry, and to explain it I must needs be personal. Three years ago, after having published a series of illustrated articles in the *Inland Architect*, entitled "Recent Fire-proof Building in Chicago," on invitation of the committee of arrangements of the American Institute of Architects, I prepared and read before the "World's Congress of Architects," at Chicago, a paper entitled "Fire-proof Construction and the Practise of American Architects." This was printed in several architectural papers, and by the Institute in its "Proceedings" for 1893 (which has no index), commencing at page 302. This paper was intended as a sort of *résumé* or *finale* to my series of articles in the *Inland*, and its whole tenor and object was to answer the query now made by your correspondent, and reiterated in your article in the April number. I had practised architecture in New York and Chicago from 1860 to 1880, had been an active contractor for fire-proof work from 1880 to 1891, and had resumed my practise as consulting architect for the immediately preceding two years. So at that time I had no interests in any system of fire-proof construction, to the study and practise of which I had devoted the better part of my life. The main objects of the paper were to warn my professional brethren against the pitfalls that lay in their way and some of the fallacies in connection with so-called fire-proof construction, as well as of the importance of consulting experts in fire-proofing as well as those on construction, sanitation, etc. I did not offer myself as a candidate, as it was well known that my practise had been largely as consulting architect, both before and after my experience in contracting. Now here is why I am surprised after reading your article. *From that day to this I have never been consulted, asked a question, or heard of any one else having been consulted on the subject.* I have therefore come to the conclusion that no such person is wanted. But if any one wants to know my views farther, he can read my paper, which he can do without expense, and I would particularly call his attention to pages 308 and 309, "Proceedings of the Twenty-seventh Annual Convention of the Institute." I think it would do no harm if you should print this or the whole of my paper, for I have not yet met any one who has read any of the four hundred pages of the "Proceedings" of that year.

My second surprise is that in giving your opinions as to the proper qualifications of such an expert, you repeatedly say that he should be a young man and omit the qualification of *experience*. I think it was Edmund Burke who said: "I am accused of the unpardonable crime of being a young man." Now, I do not think, with Burke's traducers, that there is any harm in being a young man. I was a young man a long time ago, and am not very old now; so I remember how it feels. I will not disparage youth, for I made my greatest success at twenty-two, but I am afraid that the American architects who are in want of light now will be tired of waiting until the young man you suggest has completed the four years' course of study that you recommend.

I am equally surprised that your correspondent, who I see is a Chicago man, was not aware that I have no interest now with any manufacturing or contracting company. PETER B. WIGHT.

At the time the editorial referred to was written, we did not know that Mr. Wight had more than nominally severed his connection with the firm of fire-proofing contractors with which he had been for so long a time identified, and we supposed he was still in a semi-official capacity acting as their advisor. We do not believe that a long business association with a particular manufacturer of patented fire-proofing material is in all respects the best preparation which a prospective fire-proofing engineer could have; but we are very glad to acknowledge our oversight and to testify to the high character of the work with which Mr. Wight has had to do, and to the extent to which he has raised the standards of fire-proof construction. We

know of no one who is, on the whole, so thoroughly qualified in this particular line; and when we consider the amount of ill-contrived, poorly executed work which has found expression in this country, we can but regret, with Mr. Wight, that there should seem to be so little disposition on the part of those immediately interested to put fire-proofing under the immediate direction and control of a trained expert. — *Ed.*

A NEW FIRE-PROOFING SYSTEM.

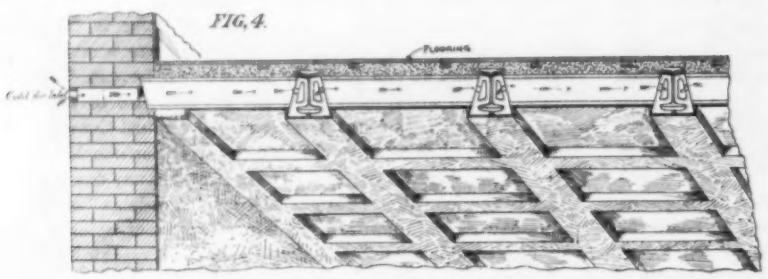
WE have received from Mr. George Rushforth, architect, of Stockton, Cal., drawings which we publish herewith, showing a system of fire-proofing devised by him. The floor is constructed with steel I-beams spaced three feet on centers, connected by hollow terra-cotta blocks. The skew-backs or beam tiles are made to fit around the webs and lower flanges of the beams, being placed parallel thereto. Between these are fitted the terra-cotta end blocks or lintels, butting directly on the beam tiles. By using tile lintels of different depths a paneled ceiling can easily be constructed with this system, as is shown by drawings. The wood centering which is found necessary in setting the hollow terra-cotta floor blocks most commonly employed can, with this system, he entirely dispensed with. For variations in the spans between beams, the lintel blocks can be cut down in length by hand.

The inventor of this system places considerable stress upon the claim of added security afforded by air being allowed to circulate freely through the terra-cotta work and round the iron beams, which is an essential feature of the construction. For this purpose air ducts are left in the exterior brick wall of the building communicating with the hollow spaces in the tiles, and holes are left in the beam tiles so that the air can be carried around the flanges of the beams. As soon as a fire begins to heat any portion of the floor, it is claimed that a rapid circulation of air is created, and that the cold air would rush to the heated place and tend to distribute the heat throughout the system.

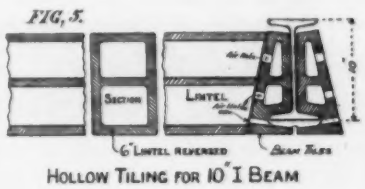
GOLD AND SILVER PRODUCT COMPARED WITH FIRE LOSSES FOR TWENTY YEARS.

IN a review of some of the causes of the present business depression and resulting hard times, the New York *Chronicle* calls attention to one cause not usually taken into consideration in discussing the situation. This factor is the fire loss of the country, which, while to a considerable extent met to the losers by the insurance companies, is in the end an absolute annihilation of wealth. The *Chronicle* gives a table, showing a comparison of the fire losses during a series of years, with the annual production of gold and silver in this country, which presents the matter in a striking aspect. The important portion of the table is as follows: —

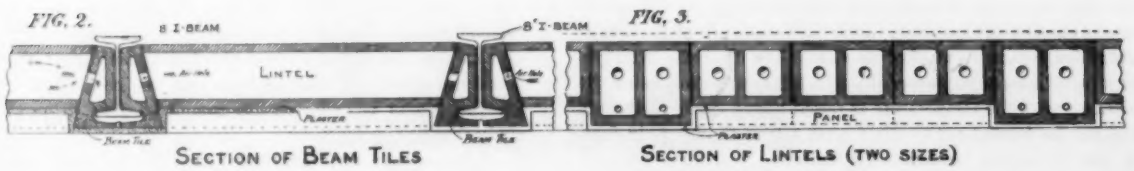
Year.	Gold and Silver.	Fire Loss.	Difference.
1875	$65,100,000	$78,102,285	$13,002,285
1876	78,708,000	64,630,600	14,069,000
1877	86,700,000	68,365,000	18,434,200
1878	96,400,000	64,315,900	32,084,100
1879	79,700,000	77,703,700	1,996,300
1880	75,200,000	74,643,100	556,600
1881	77,700,000	81,280,900	3,580,900
1882	79,300,000	84,505,024	5,205,024
1883	76,200,000	100,149,328	23,949,328
1884	79,600,000	110,008,611	30,408,611
1885	83,400,000	102,81 ,706	19,418,706
1886	86,000,000	104,924,750	18,924,750
1887	86,350,000	120,383,083	33,033,083
1888	92,370,000	110,885,665	18,515,665
1889	97,446,000	123,046,833	25,600,833
1890	103,310,000	108,993,792	5,683,792
1891	108,592,000	143,764,967	35,172,967
1892	115,101,080	151,516,098	36,415,098
1893	112,531,000	167,544,370	55,013,370
1894	103,500,000	140,006,484	35,506,484
Totals	$1,783,200,000	$2,077,390,258	$294,190,258



PANELLED CEILING FORMED BY USING TWO SIZES OF LINTELS.

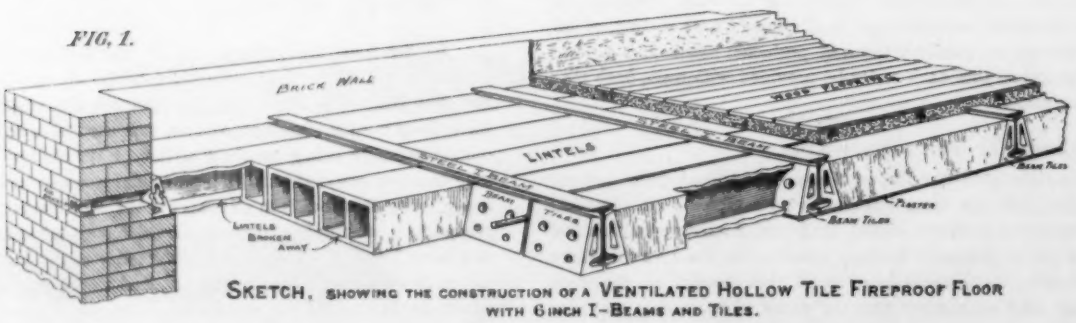


HOLLOW TILING FOR 10" I BEAM



SECTION OF BEAM TILES

SECTION OF LINTELS (TWO SIZES)



SKETCH, SHOWING THE CONSTRUCTION OF A VENTILATED HOLLOW TILE FIREPROOF FLOOR WITH 6 INCH I-BEAMS AND TILES.

Mortars and Concrete Department.

Devoted to Advanced Methods of using Cements and Limes in Building Construction.

AMERICAN CEMENT.

BY URIAH CUMMINGS.

CHAPTER VII.

CEMENT TESTING. (*Continued.*)

SPECIFICATIONS governing cement tests, derived from various authentic sources, are herewith given: —

U. S. ENGINEER OFFICE,
PORTLAND, MAINE, Feb. 14, 1893.

PETER C. HAINS, LIEUT.-COL. OF ENGINEERS.

The cement is to be hydraulic, uniform in quality, fresh, dry, finely ground, free from lumps, and put up in good sound barrels, each barrel of cement to weigh not less than 300 lbs. net. A sample is to be submitted for test, and the entire quantity delivered must be fully up to the sample.

The cement must not set within twenty minutes. Briquettes made of neat cement, mixed with a proper proportion of water, must show a tensile strength per square inch of not less than 60 lbs. after exposure to the air for twenty-four hours; kept one day in air and six in water, not less than 100 lbs.; and kept one day in air and twenty-seven in water, not less than 180 lbs.

At least 90 per cent. must pass through a sieve of 2,500 meshes to the square inch.

The cement will be subjected to such other tests as the engineer may deem necessary.

U. S. ENGINEER OFFICE,
ARMY BUILDING, 39 WHITEHALL STREET,
NEW YORK, N. Y., Jan. 25, 1893.

G. L. GILLESPIE, LIEUT.-COL. CORPS OF ENGINEERS.

The cement will be of first quality American cement, fresh, dry, full weight, finely ground, free from lumps, and put up in good sound barrels.

The bids will state the special brand proposed to be furnished, and the bidder will deliver a sample barrel upon Pier 3, East River, for test, at least ten days before the opening of the bids.

The cement will be expected to stand the following tests: Cement neat must be set in about thirty minutes, and have tensile strength per square inch as follows: —

Samples which have been kept in air and broken at twenty-four hours after setting, 70 lbs.; at seven days, 125 lbs.; at fourteen days, 170 lbs.; and at thirty days, 225 lbs.

Samples which have been kept twenty-four hours in air and then in water until broken: at twenty-four hours, 70 lbs.; at seven days, 90 lbs.; at fourteen days, 120 lbs.; and at thirty days, 150 lbs.

Cement one part, sand two parts, tensile strength per square inch, samples kept in air until broken: at twenty-four hours, 15 lbs.; at seven days, 35 lbs.; at fourteen days, 50 lbs.; and at thirty days, 65 lbs.; and immersed in water twenty-four hours after setting: at twenty-four hours, 15 lbs.; at seven days, 30 lbs.; at fourteen days, 45 lbs.; and at thirty days, 65 lbs.

U. S. ENGINEER OFFICE,
CUSTOM HOUSE, PITTSBURGH, PENN., July 31, 1894.

CAPT. R. L. HOXIE, CORPS OF ENGINEERS, U. S. A.

AMERICAN HYDRAULIC CEMENT.

INSPECTION.— Ten per cent. of the packages in each car-load, and no more, will be selected for weighing and testing. The net weight and quality of all cement in each car-load will be determined by weighing and testing these selected packages. The average net weight of all packages in each car-load lot will be the average net weight of all the selected packages. The failure of any one of the selected packages to stand the required tests will be sufficient reason for rejecting this car-load lot, excepting only those packages which may have stood the test. Rejected cement will be immediately reshipped to the contractor at his expense, and the cost of all handling of same will be charged against his account.

FINENESS.— Ninety-five per cent. by weight must pass through a cement wire sieve having 2,500 meshes per square inch, and made of No. 35 wire, Stubb's W. G.

PREPARATION OF TEST BRIQUETTES.— Cement will be mixed neat, with enough water only to thoroughly moisten and make it coherent, and will be pressed into the mold with a spatula. Temperature not below 60°.

SETTING.— The surface must yield to the pressure of a wire $\frac{1}{24}$ in. diameter, carrying a weight of 1 lb. thirty minutes after completion of briquette.

TENSILE STRENGTH PER SQUARE INCH OF CROSS-SECTION. — This will be for each package the average strength of five briquettes. These will be kept in air until set, and then immersed in water until they are put into the clips of the testing machine, being tested wet. After twenty-four hours' immersion in water, the tensile strength must be 70 lbs., and after seven days' immersion, 125 lbs.

CHECKING AND CRACKING.— When made into a thin cake, allowed to set in air, and immersed in water, no checking or cracking must be shown.

Specifications for the cement used in the masonry of the depressed Harlem Railroad tracks in New York City.

The cement must be of the best quality of freshly burned and ground hydraulic cement. It will be subject to test made by the engineer or his appointed inspector, and must stand a proof tensile test of 50 lbs. per square inch of sectional area on specimens mixed to a stiff paste and allowed a set of thirty minutes in air and twenty-four hours under water; and of 90 lbs. on specimens allowed a set of seven days under water, and shall be 90 per cent. fine when tried with a sieve of 2,500 meshes to the square inch.

It must take not less than twenty-five minutes to bear the light wire — that is, a weight of 4 ozs. on a wire one twelfth of an inch in diameter.

The following specifications for hydraulic cement were drawn by a United States engineer who advertised for a large amount of cement and received but one bid.

The cement must possess the following requisites: —

FIRST.— It must be fresh, slow setting, and so finely ground that 85 per cent. of it shall pass through a sieve of 2,500 meshes per square inch.

SECOND.— After being mixed neat and filled into a glass bottle, or similar vessel, and struck level with the top, it must not crack the vessel in setting, nor rise out of it, nor become loose in it by shrinkage.

THIRD.— When mixed neat and made up into briquettes, and given one hour in air, then twenty-three hours in water, the cement must be capable of withstanding a tensile strain of 35 lbs. per square inch before it is fractured; and after seven days in water, succeeding the first hour in air, it must sustain a tensile strain of 125 lbs. per square inch.

FOURTH.— Its initial setting shall not take place in less than thirty minutes from the time it is mixed neat into a paste.

FIFTH.— The cement must possess reliable uniformity of all these qualities.

It will be noted that these specifications state that "the cement must be fresh," and yet, "the initial set must not take place in less than thirty minutes."

It is doubtful if any brand of rock cement could fulfil all the requirements.

The following letter is in reply to an inquiry by the author: —

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING ARCHITECT,
WASHINGTON, D. C., May 14, 1896.

Sir: — Replying to your letter of the 11th inst., you are informed that the requirements of cement to be used under this office are as follows: —

Hydraulic cement, mixed neat, one day in air and six days in water, should stand a tensile strain of 90 lbs. per square inch.

Portland cement, mixed neat, one day in air and six days in water, should stand a tensile strain of 350 lbs. per square inch.

This office has no printed forms governing the making of mortars and concretes; specifications for this class of work vary according to circumstances.

Respectfully yours,

(Signed) WM. M. AIKEN,
Supervising Architect.

1895.

DEPARTMENT OF PUBLIC WORKS,
PEORIA, ILLINOIS.

ALMON D. THOMPSON, CITY ENGINEER.

All cement for concrete foundations shall be what is commonly known as American Natural Hydraulic Cement, of quality equal to the best obtainable in the markets. All Portland cement used on the work shall be the best obtainable in the markets. They will be subjected to rigid inspection, and that rejected shall be immediately removed by the contractor.

The contractor must submit the cement for inspection and testing at least ten days before using, and such inspection and tests will be made only from samples obtained by the inspector from cement delivered on the work.

The inspector shall be notified of each delivery of cement. All cement must stand the following tests: —

Two cakes, 3 ins. in diameter and ½ in. thick, with thin edges, will be made.

One of these cakes as soon as set will be placed in water and examined from day to day. If the cake exhibits checks, cracks, or contortions, the cement will be rejected. The other cake described will be used for setting and color tests.

The time will be noted when the cake has become hard enough to sustain a wire $\frac{1}{12}$ in. in diameter loaded with ¼ lb.

When the wire is sustained, the cement has begun to set, and this time shall not be less than ten minutes for natural cement, nor less than forty-five minutes for Portland cement.

When the cake will sustain a wire $\frac{1}{24}$ in. in diameter loaded with 1 lb., the set is complete, and this time must not be less than one hour nor more than three hours for natural cement, nor less than two hours nor more than six hours for Portland cement.

The cake used for setting test will be preserved, and when examined from day to day must be of uniform color, exhibiting no blotches or discolorations.

The cement must be evenly ground, and, when tested with the following standard sieves, must pass at least the following percentages: —

	Natural.	Portland.
No. 20 sieve, having 20 meshes per lineal inch .	100%	
No. 50 sieve, having 50 meshes per lineal inch .	90%	98%
No. 74 sieve, having 74 meshes per lineal inch .	80%	94%
No. 100 sieve, having 100 meshes per lineal inch .		90%

The diameter of wire for sieves being respectively: —

For. No. 20 sieve, No. 28 Stubb's wire gauge.
For No. 50 sieve, No. 35 Stubb's wire gauge.
For No. 74 sieve, No. 37 Stubb's wire gauge.
For No. 100 sieve, No. 40 Stubb's wire gauge.

All cement for test briquettes will be mixed with barely sufficient water to make a stiff mortar.

The neat briquettes to be pressed into the molds by hand and the sand briquettes to be compacted by light tapping.

The sand for cement tests will be crushed quartzite of such fineness that all will pass a sieve of 20 meshes per lineal inch, and none of it a sieve of 30 meshes per lineal inch.

The required tensile strength per square inch shall be as follows: —

Neat Cement.	Natural.	Portland.
One day, till set in air, remainder of time in water .	60 lbs.	150 lbs.
One week, one day in air, six days in water . . .	150 lbs.	400 lbs.

CEMENT ONE PART AND SAND TWO PARTS.

One week — one day in air, six days in water . . 75 lbs.

CEMENT ONE PART AND SAND ONE AND ONE HALF PARTS.

One week — one day in air, six days in water . . 85 lbs.

CEMENT ONE PART AND SAND THREE PARTS.

One week — one day in air, six days in water . . . . . 140 lbs.

Briquettes for the seven-day tests shall be covered for the first twenty-four hours with a damp cloth.

(*To be continued.*)

THE strength of a concrete slab was recently made the subject of an interesting test at the laboratory of the Massachusetts Institute of Technology, Boston, Mass. This slab was a section of flooring designed to be used in a courtyard for a dormitory building, and which had to carry coal teams, etc. Brick arches had been specified for this floor, but on account of the lower bid for concrete flooring, the authorities decided to test it. In the test the slab was supported by four I-beams spaced 4 ft. 9 ins. c. to c. and was 5 by 14 ft. by 4 ins. with ¾ in. twisted steel bars spaced 6 ins. c. to c. and running lengthwise, and $\frac{5}{16}$ in. bars running crosswise, 4 ft. 9 ins. apart, or directly over each I-beam. The composition of the concrete was 1 part Alsen's Portland cement, 1 part sand, and 6 parts broken stone. The stone was crushed so that 2 parts passed a ½ in. ring and 4 parts a ¼ in. ring. Bricks were piled on in piers until a load of 16,770 lbs., or 724 lbs. per square foot, was obtained and a depression of $\frac{5}{32}$ in. resulted. This load of course covered only the span between two I-beams. Next an impact test, consisting of dropping a timber weighing 164½ lbs. endwise onto the slab 20 ins. from the nearest I-beam and from a height of 7 ft. 10 ins. was made without causing any break or damage whatever. The third test was for shearing, and consisted in thrusting with a screw-jack against an I-beam laid transversly across the slab about midway between the I-beams, until a pressure of 20,700 lbs., with a deflection of $1\frac{3}{32}$ ins., was obtained before the concrete cracked. By means of the same screw-jack a more local pressure covering an area of 1½ by 9 ins. was tried. When placed so as to bring the pressure over two of the twisted iron bars the load borne was 6,200 lbs., and over one bar 7,700 lbs. were carried. It is stated that several faults of construction entered into this slab, or else it would have shown still better results. — *Eng. News.*

The Masons' Department.

Conducted in the Interests of the Mason and the Contractor for Brickwork.

THE ARCHITECT AND CONTRACTOR.

BY THOMAS A. FOX.

METHODS OF ESTIMATING. (*Continued.*)

THE preceding paper was devoted to a brief analysis of the methods of estimating which are in general use, and it was shown that both architect and contractor, and consequently the owner, suffered each in his way under the system as described. Although there are many minor abuses on either side, the most serious one with which the architect has to contend is that of checking excessive charges or insufficient allowances; the contractor, on the other hand, is often obliged to base his estimates upon incomplete and defective drawings and specifications which are vague and general in their language. These evils, which are quite common even among some of the best architects and contractors, go hand in hand, that is to say, one is the result of the other; so the responsibility for this unsatisfactory condition of things may be safely said to be about equally divided between the architect and contractor. No reform can be made in a matter like this without a certain amount of concession from each side, and it would seem to be a fair proposition for the architects to say, "We will agree to present for estimate a set of drawings so complete that the quantities of all materials can be accurately determined, and specifications which will correctly and precisely describe the materials and the conditions under which the work must be executed, but in return you, the contractors, must place in our hands the means of settling for extra work and work omitted at the same rate at which similar work was figured in the estimate." If such an agreement could be reached, it could not fail to prove of the greatest benefit to all parties concerned in building operations, for it would at once remove the greatest factors of uncertainty which exist under the present conditions. If we turn to the method of estimating employed in England, we shall find, while it is probably too complicated to be introduced in its entirety, yet it contains many features which, in modified form, could be most profitably adopted into our practise here. And it is worth while to note, in passing, that for those concerned in such matters there is no more interesting and instructive reading than the English text-books, that country being much older than ours, extensive building operations have, of course, been carried on through a much longer period, with the result that many of the problems with which we are at present struggling have there been fought out and settled, and the new and unforeseen contingencies which are continually appearing with us to vex the architect or contractor have, in the older country, been met so often that they are now apprehended and provided for in advance. The thoroughness with which the English work is carried on necessarily involves an amount of detail from which the American architect and contractor would at first instinctively shrink. They would both of them think at first sight that it was more profitable to shirk the added work and trust to luck; but if such safeguards as exist in the older countries could once be adopted here, they would do away with most of the friction which now occurs, and would relieve us of many of the worries and vexations which now make our work so wearing, and the results often so unsatisfactory.

The English method of estimating is briefly this: After the architect has prepared the plans and specifications, they are given to a quantity surveyor, whose duty it is to make an accurate bill of quantities, tabulated in such form as to enable the contractor to place opposite each item its value, the sum of these items making the estimate for which he is willing to undertake the work. Within a week of signing the contract the contractor is usually required to deposit with the architect "a full-priced copy of the estimate," and one of the general conditions of the specifications read, "extras and omissions to be valued at the price of the contract, and any item of extra work which does not exactly agree with the descriptions of the original estimate to be valued at a price analogous thereto." It can be readily seen that this method strikes at the root of our greatest evils. No sworn surveyor whose reputation is at stake would put his name to a bill of quantities unless it were, to the best of his knowledge, accurate — and no accurate bill of quantities can be made unless the drawings and specifications are complete and definite. On the other hand the architect is assured that the fair market value will be allowed for extras and omissions, and it cannot be denied that with these two matters, so productive of delays, complications, and disagreements, settled, that both the architect and contractor would find opportunity to devote themselves to many essential things in connection with their work which are now neglected for want of time. The quantity surveyor stands practically as an arbitrator between the architect and contractor, and his compensation, two and one half per cent., is ample to secure the employment of a competent person; he is paid by the owner, so there is no reason, on the ground of economy, to dispense with his services, and he is liable to the contractor for any proved inaccuracies in his work. The care and thoroughness with which the surveyor's work is done may be seen from the fact that three distinct operations are used to complete the work, namely: the "taking off," which consists in taking the amounts of the different materials with a description of the work; "abstracting," which consists of combining the quantities of similar kind and reducing them to the units in accordance with the custom of the trade; and finally "billing," which tabulates the quantities with descriptions and sketches in such a form that the contractor can place opposite each unit its value. The systems under which these different operations are carried on are such that there is but small liability that any item will be overlooked, and at the same time the work is so arranged that each item can be easily traced through the successive stages.

Nor are we dependent upon the English alone for precedents in this matter, for a similar method is employed in France, where the contractor figures the percentage of profit at which he is willing to undertake the work, the basis being a government list of prices which is amended from time to time.

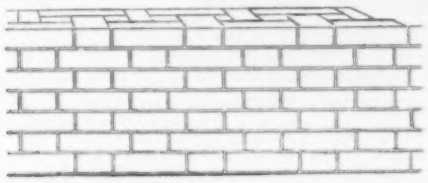
It has already been stated that it would probably be impracticable, if not impossible, to introduce the English method of estimating as a whole, but some of its salient features might well be adopted by us, and would undoubtedly improve our system as practised at the present time, but even this reform cannot be accomplished without opposition from both sides. Many architects would undoubtedly say, if such a change was proposed, "I have no difficulty in finding contractors who are willing to figure my work under the present system. Why, then, should I be put to the trouble and expense of doing unnecessary work?" And the contractor, in his turn, would say, "I see no reason why I should open my books for the architect's inspection and, moreover, it's nobody's business how I arrive at my results."

The simple fact is that in our methods of estimating, as in almost all similar operations, we are led astray from the path of thoroughness and conservatism by the speculative tendencies of our race and time. Instead of conducting our business in accordance with well-defined and recognized principles, we half complete our work, thrust it on the market, and take our chances. This is not the way to accomplish the best results. The American Institute of Architects and the National Association of Builders have conjointly given us the uniform contract, which has settled many of the contested points between architects and contractors, and has prepared the way for further legislation of the same sort, and there is certainly no direction in which the united efforts of these two organizations can better be turned than to reform the present defective methods of estimating.

(*To be continued.*)

BONDING OF BRICKWORK.

THE Dutch succeeded to the Roman skill in brickmaking and masonry with greater facility than did the English, as their earliest works clearly show. But the method of building walls in Flanders known as Flemish Bond, so pleasing to the eye, is the weakest of all bonds, the most trying and time-consuming to the mason, and the most expensive method of laying brick,— the weakest, because the shortest possible overlap; the most tedious, because of the ever-varying widths and lengths in the American brick, requiring so much culling and clipping. The bond is always running over or falling back; and unless the upright joints in alternate

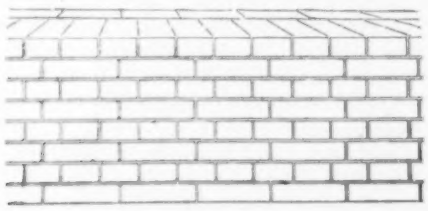


FLEMISH BOND.

courses are kept on the plumb-line, the pleasing effect is lost. Slovenly workmanship, added to weakness and excessive expense, is inexcusable.

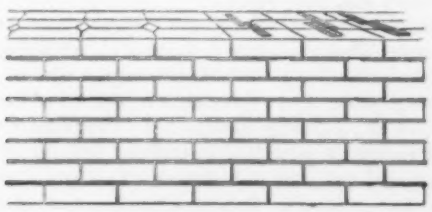
Ugliness is a fair apology for strength, utility, and possibly for economy. But the English bond, weak, costly, and ugly, too, has fallen into "innocuous desuetude." The nearest approach to it on this side of the water is that established by law in New York; *one course in five must be headers*, and it is doubtful if a practical mason had anything to say in framing that. It is costly because the mason makes so much better progress laying stretchers; weak, from the excessive number of upright joints.

Since the advent of power press brick in this country for facing walls, the trend of masonry has been to discard all use of headers



ENGLISH BOND.

and present a front with the fewest possible number of upright joints, preserving always the plumb-bond in alternate courses. This has been accomplished by laying an occasional course called a herring-bone, and breaking away the back corners of the face, pushing the corners of the diagonal course nearly to the outside line of the wall; or, by breaking away the back corner of the face brick, as

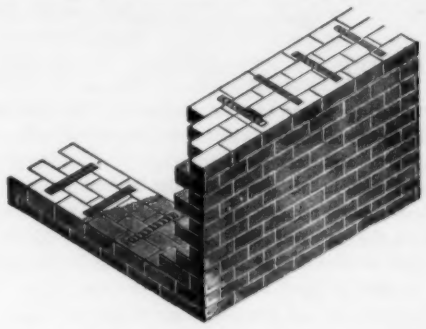


OLD METHOD. NEW METHOD.
AMERICAN BOND.

before, and the front corner of the adjoining course and filling the diagonal space with half brick.

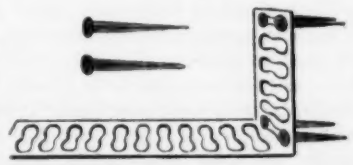
Again, facing brick have been bound into the wall with strips of hoop-iron six inches long laid across each brick in the course, eight or nine courses apart; but this, though cheaper and quicker, and without waste of material, may not be the best way. More recently some have used strips of perforated steel, about half the metal being punched away, allowing them readily to fall into the mortar and bed themselves; the brick may be brought down to close joint, and the clinching spaces make this a very firm and satisfactory binder, intelligent, mechanical, and inexpensive.

The same thing has been used for tying new work to old where walls require lining up to increase their strength. The tie is bent



near the middle at right angles, and nailed to the old wall with pointed wrought iron nails, made for the purpose, and of sufficient size to hold it firmly in position to receive the new courses which are to enclose it in the lateral joint. Thus avoiding the cutting to pieces and weakening of the old wall, already too weak, to get in a cross header, which at best must hold very imperfectly, after the inevitable shrinkage that comes to all new brickwork.

The crush-resisting strength of a wall is never tested, never questioned. We add course upon course after there is ample strength to carry the burden; these additions are to stiffen the wall, to resist vibrations, to keep it in line. It is held to plumb-line with cross partitions and anchor ties. Why not lay these additional courses, all stretchers with the longest possible overlap bound together with steel ties? Float the brick home in ample machine-rabbed mortar to fill bed and upright joints; lay in the perforated steel ties



once in five courses, make the wall a solid mass of selected water-struck brick, bound together with bands of steel, held in place by a rivet of mortar through every clinching space, and you have a 16 in. wall equal to the common 20 in. Whatever lengthens the fiber strengthens the fabric. When land is worth $10 a foot, four inches in width on six stories equals a $20 gain in every running foot of wall, and this, too, with a more elastic and reliable building.

A. MASON.

CEMENT SIDEWALKS.

REPLYING to a correspondent who has had difficulty in making a cement sidewalk retain a smooth surface, a writer in *Paving and Municipal Engineering* says:—

"While the top mixture should be thoroughly rammed or beaten and well troweled, yet this treatment should not be continued so long as to bring to the surface a considerable quantity of neat cement, thus leaving the layer of mortar next below without sufficient cement to bind it together. If this is done, the thin layer of neat cement may flake off when set, revealing a layer of almost clear sand below. A similar result obtains if one attempts to retrowel a surface once finished and partially set but afterwards defaced. Sprinkling the walk before the cement has thoroughly set may cause blisters which mar the appearance of the work; on the other hand, the walk should be protected from the direct rays of the hot sun, or surface cracks may result."

Recent Brick and Terra-Cotta Work in American Cities.

A Department Devoted to the Interests of the Manufacturer.

CHICAGO. — About one o'clock on the first Monday of each month, Chicago architects may be seen dropping in by ones and twos through the Washington Street entrance of the Institute of Building Arts. This has become a recognized institution, in reality, a large sample room for architects, where every prominent manufacturer of building material or contrivance keeps a specimen of his work on permanent exhibition. The large display rooms, which are under the direct management of the Institute of American Architects, afford good opportunities for the architect to find what he wants and show it to his client. Everything stands ready to be "put through its paces," whether a dumb waiter, a plumbing fixture, or a window screen. A large share of space is given up to displays of fire-proofing, terra-cotta, pressed brick, etc., as well as marble, tile, and interior decoration. In a quiet place at one side a club-room has been reserved, and here once a month the architects gather, with the president of the chapter at the head of the table, and have luncheon and a chat. It is a treat to be present on such an occasion, and after enjoying a good menu, to listen to the discussion of the confident, brilliant young architect, and the quieter opinions of some of the veterans of the profession who have helped build up a great city almost from the days of Fort Dearborn. On the last occasion of this kind, there was present a brick manufacturer who asked the opinions of his hosts on the probable demand for an American enamel brick equal to the English make. This brought forth points on processes of manufacture, influence of the protective tariff, difference between "enamel" and "glaze," prices and possible demands in relation thereto, and so on.

EXECUTED IN TERRA-COTTA BY THE AMERICAN TERRA-COTTA AND CERAMIC COMPANY.

At one of these meetings a gray-haired member answered a question thus: "No, our organization has not done much for the standing of the profession; we have too much jealousy of each other, we are like the medical profession before diplomas were a legal requirement." When will the American Institute number a majority of architects in its membership and do as much for a code of practise (real, not theoretical) as a hod-carriers' union does for its members?

Speaking of architectural news, although hard times have brought into prominence the ten-cent continuous vaudeville, yet no less than seven schemes for amusement buildings are talked of, and these following the Great Northern Theater and the Coliseum. One of these undertakings is being carried out by architects Hill & Woltersdorf. It is the remodelling of the Casino to make an auditorium to seat seventeen hundred and to be run on the plan of Koster & Bial's, New York. The other schemes have not progressed beyond paper.

Among announcements recently are some fine residences by W. A. Otis and H. V. D. Shaw. Mr. D. Adler is engaged on a seven story shoe factory 92 by 103 ft. in plan of mill construction. He has designed also a building for the Chicago University, comprising a dormitory and gymnasium.

A project which is causing artistic pains and architectural horrors is that of adding three new stories to the County Court Building, a structure which is notorious for its poor arrangement and waste of darkness and money. The indications are that the foundations are already overloaded; but the idea seems to be to remove enough superfluous masonry to allow for a skeleton three-story addition. The County Board has appropriated five hundred dollars, which its architect is to use on preliminary plans. It is to be hoped that the demand for additional space may be met in some other way, until it becomes possible to replace the present structure with a worthy building.

EXECUTED IN TERRA-COTTA BY THE NORTHWESTERN TERRA-COTTA COMPANY.

ST. LOUIS. — As the season advances business becomes quieter. In fact, there is no new work of any consequence in contemplation, and there is talk of one or two of the leading architectural firms closing their offices until the revival of business.

Most of the work commenced earlier in the year, and for which arrangements for the money had been made before the silver craze became such a factor, is being finished, but it is impossible to secure money for new enterprises.

Every day furnishes new evidence of the evil results of political disturbances. Factories of all kinds are either reducing their forces, running shorter hours, or shutting down altogether. Only the other day a large factory on the other side of the river closed down, throwing out of employment about one thousand hands. The manufacturers state that owing to the possible disturbance in our financial system their customers are placing only such orders as are required to meet actual demands, and these are not sufficient to warrant their continuing business for the present, at least.

The business interests in a city usually become centralized, and the different districts become known as the retail or wholesale district, etc. This change is rapidly taking place here. Broadway is our great retail street, which also extends west, some on Olive Street. Washington Avenue is fast filling up with wholesale dry goods, shoes, etc., while Cupples Station and vicinity is becoming a wholesale district exclusively, but of a class requiring good shipping facilities, such as hardware, groceries, etc. Second and Third Streets are devoted to the commission houses, while Chestnut is known as Realty Row.

Fourth Street is the Wall Street of St. Louis. Since the State Bank of Missouri moved into the magnificent ten-story structure, erected on the corner of Fourth and Locust Streets, a few years ago, and the Fourth National Bank into the Rialto Building, there have been three other banks located in new quarters on the same street.

Two years ago the National Bank of the Republic built itself a beautiful little home adjoining the Rialto Building. It was only one story, but that seems to be the prevailing fashion for bank buildings. The Mississippi Valley Trust Company has just moved into its magnificent quarters at Fourth and Pine Streets, which is just receiving the finishing touches. It is a stone structure, and although two stories high, the counting room of the bank which faces the two streets extends to the roof. The ceiling is heavily paneled and richly decorated. In the rear of the counting room a stair leads to the balcony, which is used as the work-room for the clerks, etc. The building is of a dignified, classical design, showing much refinement in the detail. Messrs. Eames & Young were the architects, and Mr. Jas. L. Bright the builder. The building on Fourth Street, vacated by the Mississippi Valley Trust Company, is being remodeled by architect E. A. Manny, for the Continental National Bank, and it promises to be equal to any of its neighbors.

PITTSBURG. — It is reported that Longfellow, Alden & Harlow are the architects for a magnificent hotel to cost $1,000,000, which will be put up in this city.

Architects Peabody & Stearns, who have opened an office here, are preparing plans for a colonial residence for Ed. H. Binn, to cost $25,000.

The congregation of Trinity Protestant Episcopal Church, of Braddock, has decided to erect a new edifice, to cost $20,000.

Architect E. B. Milligan is preparing plans for a brick and stone church for the East End Presbyterian congregation, corner of Peoples and South Avenues, to cost about $12,000.

Architect J. E. Allison has been commissioned to prepare plans for a brick and stone church for the First Presbyterian Congregation of Vandegrift, to cost about $16,000.

Architect J. L. Beatty is preparing plans for a brick church to be erected at Indiana, Penn.; the same architect has prepared plans for an office building and apartment house for the Allegheny Heating Company on West Diamond Street.

Architects McKee & Waughter are preparing plans for a twelve-room schoolhouse for the thirteenth ward, to cost nearly $30,000.

Architect Edward Stotz is preparing plans for a large two-story brick schoolhouse, which will be erected at Hazelwood.

Architect T. E. Cornelius is preparing plans for a public school to be erected at Coraopolis, two stories high, of brick and stone.

Architects Bartberger & East have prepared plans for a three-story brick hotel for Daniel Cusack, to be erected at Shanopin; also a three-story brick hotel for Charles Stokey, to be erected at Zelienople.

Architect Joseph Stillberg is preparing plans for a four-story brick hotel for John Thier, to be erected at Braddock.

TERRA-COTTA DETAIL FOR APARTMENT HOUSE, PHILADELPHIA.

Made by Conkling-Armstrong Terra-Cotta Company.

Architect J. F. Steen has prepared plans for a handsome brick colonial residence for W. H. Berger, on Linden Avenue, near Penn.

Architect Charles W. Bier is preparing plans for a three-story building for the Sisters of St. John's Roman Catholic Church, to be erected in Bloomfield.

Architects Shaw & Metcalf are preparing plans for a twelve-room colonial brick residence, to be erected in Bellevue.

Architects Boyd & Long are preparing plans for a colonial brick residence of twelve rooms, on Elliott Street.

Architect T. C. McKee is preparing plans for three $15,000 red pressed brick colonial dwellings in the East End.

BUFFALO. — The political firmament, with its gold and silver myth, has produced evil results upon building operations here.

Bright gleams of hope filled the minds of some private individuals, promoters, etc., who were contemplating buildings of importance, but the banks and capitalists raised a serious cry of "Wait for the St. Louis Convention and its platform."

The advance agent of prosperity restored their confidence but momentarily, for at Chicago came the climax, and the hopes that were smoldering in the breast were hushed to rest within that grave of uncertainty — I say "grave of uncertainty," for the general impression is stagnation in building until after election, and the probable outcome is still a greater question.

The disaster caused by part of the old Brown Building collapsing while undergoing repairs, in which several lives were lost, disclosed, under a strict investigation by the district attorney, that an architect had not been retained upon the building, while a defective column and its improper base produced the sad affair.

While examination showed the superintendent of buildings and his assistant somewhat careless, no blame could be placed upon this department; the verdict showed gross neglect on the part of the dead mason contractor, and convicted the living sub-contractor.

The tendency will, no doubt, end in raising the architectural standard here, and produce a marvelous effect upon the building superintendent in having plans properly investigated and rattle-traps inspected, as it has aroused universal indignation.

Among buildings in process of construction may be noted: —

St. Paul's Guild House, Pearl and Erie Streets, $40,000, Green & Wicks, architects.

Brick block, corner Connecticut and Normal Avenue, $50,000, Charles E. Swan, architect.

Colonial apartments, Delaware Avenue, five stories high, red brick with marble trimming, cost, $50,000, Boughton & Johnson, architects.

PART OF TERRA-COTTA MANTEL.

Made for residence of George M. Hutton, Esq., Newport, R. I., by the Perth Amboy Terra-Cotta Company. Peabody & Stearns, Architects.

Three-story brick and terra-cotta flat for A. V. Roys, $20,000, Phillips & Pentecost, architects.

Larkin Soap Company, Seneca and Heacock Streets, six-story brick factory and warehouse, 66 ft. by 150 ft., cost, $50,000.

Residence for W. H. Glenny, Ferry Street and Delaware Avenue, cost, $30,000, Green & Wicks architects.

Residence for Charles H. Williams, corner North and Delaware Avenue, cost, $60,000, brick with marble trimmings, McKim, Mead & White, architects, New York.

TERRA-COTTA PANEL.
Executed by the New Jersey Terra-Cotta Company.

MINNEAPOLIS.—Building operations continue here on same scale as at last reports. We do not look for any material improvement before next spring, capital being generally disposed to wait developments in November before making any further venture of any magnitude. There have been enough large enterprises temporarily laid aside to insure a brisk season next year, provided a mistake is not made at the election next fall.

Architect W. B. Durrell has planned a three-story fire-proof building for W. H. Eustis, at Third Avenue, South and 5th Streets, 71 by 100 ft.; press brick and brownstone; cost, $50,000.

The contract for new brick school building at Lamberton, Minn., was let to Erick Lund, of Minneapolis, at $14,039, using common brick. Orff & Joraleman, architects.

H. W. Jones has planned two new schoolhouses for Richfield, Minn., 40 by 80 ft., two story; one of pressed brick, to cost $8,000, the other of common brick, to cost about $5,000. Contracts let August 8.

On Friday, July 17, a number of architects and contractors visited the plant of the Northwestern Brick & Fire-proofing Company, at 38th Avenue and Marshall Street, to inspect the clay deposit and plant and to witness the test of several terra-cotta arches. They found over forty acres of clay of fine quality, 50 ft. deep, apparently inexhaustible. They inspected several arches which had been laid up for actual service, and a committee of architects was selected to conduct the test. They selected a 6 in. segment of 12 ft. span, which had stood for eighteen days with a load of 550 lbs. to square foot, for a special test. This arch was loaded up to 1,020 lbs. per square foot, without any signs of weakening whatever, which makes a remarkably good record for the hollow terra-cotta in question.

ST. PAUL.—Contracts were recently let to Butler-Ryan Company, of St. Paul, for new office building for Northern Pacific Railway Company, to be L shaped, 116 ft. on Broadway, 62 ft. deep, and running back 120 ft. from corner. To be five stories and basement; two lower stories of granite, balance mottled brick, pressed and ornamental and terra-cotta. There will be a one-story detached engine house 80 by 37 ft., of pressed brick. To be iron and steel construction, fire-proof, and cost about $180,000. Cass Gilbert, architect.

Plans have been ordered for a new four-room schoolhouse on Wayzata and Albemarle Streets, to cost $12,000.

Buechner & Jacobsen have been selected as architects for Catholic Theological Seminary at Dubuque, Iowa, to cost $100,000.

ROCHESTER.—The same old tale of woe that has been ground out for the last few months can only be repeated—there is very little going on.

The Building Committee of St. Paul's Protestant Episcopal Church have let contracts to A. Friedrich & Sons and T. W. Finncane for the erection of their new edifice. Building will be of Buff Amherst stone, and will cost, including parish house, $150,000. Parish house will be partly of pressed brick. Heins & LaFarge, of New York, are architects.

Architect Geo. F. Hutchison has let contracts to Kneale & Stuart for the erection of a four-story manufacturing building, to be built on Court Street, for Sargent & Greenleaf.

Same architect has prepared plans for a two-story store and office building to be built at Caledonia. Press brick, furnished by the New York Hydraulic Press Brick Company.

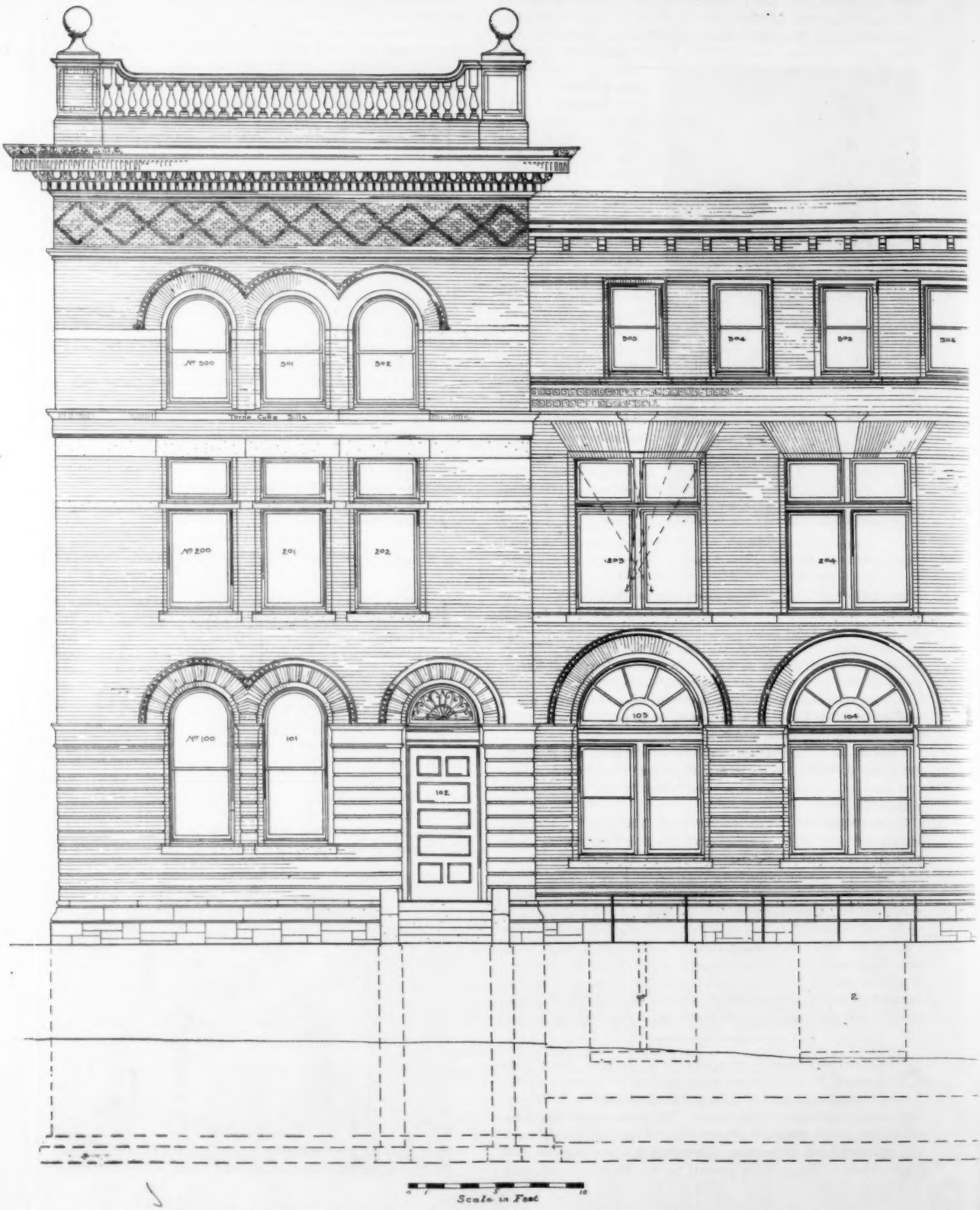
Also $15,000 house to be built at Lancaster, press brick furnished by same company.

Chas. F. Crandall, architect, has let contracts to W. H. Gorsline for the erection of a two-story morgue for Jeffreys & Co., to be built on East Avenue. Building will be of brown rock-faced press brick and terra-cotta, furnished by the New York Hydraulic Press Brick Company.

Same architect has also prepared plans for an addition to Webster Union School, cost, $10,000.

NEW VETERINARY COLLEGE BUILDING, CORNELL UNIVERSITY.

THE new veterinary college building recently completed for Cornell University is a structure of yellow brick and terra-cotta 140 ft. long with a depth of about 200 ft. It is one of six buildings which the State is to provide for the various departments of veterinary science. The building in design presents a straight front in three stories, with slightly projecting pavilions at each end, and a central portico crowned above the third story by a low dome. We publish on page 156 a drawing showing one of the end pavilions of the front of the building, and below we reproduce the arms of the State of New York, which crown the central portion of the building. This work was modeled by Mr. Louis Roncoli, of the New York Architectural Terra-cotta Company, from a small engraving which was supplied by the Secretary of State. This building has been erected from the designs of Professors Osborne and Martin, of the Architectural Department of the University.



END PAVILION OF THE NEW VETERINARY COLLEGE, CORNELL UNIVERSITY.

AN INTERESTING STUDY IN THE DISINTEGRATION OF BRICKS.

WE publish below three illustrations showing climatic effects on brick walls that were built of very poor and porous bricks, such as are found among the common bricks made in many

FIG. 1.

parts of the country, and which become quickly saturated with water during storms which, freezing and thawing with the changes of temperature, crack and chip the surface of the brick to an extent hardly

FIG. 2.

appreciated by those familiar only with our more dense and compact bricks.

That it is possible to preserve the surface of such a wall would seem to be demonstrated by the results shown in the accompanying illustrations.

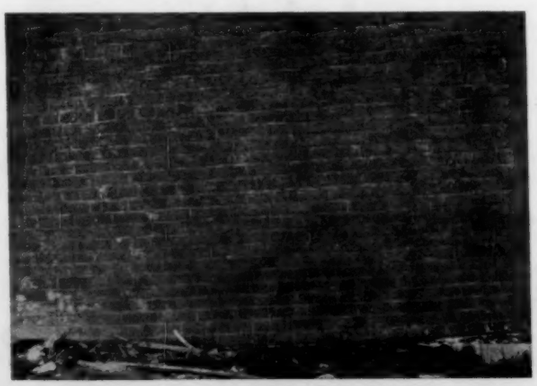


FIG. 3.

Figure 1 shows the cracked and chipped condition of a wall at the northeast corner of a house on Howe Street, Vancouver, built four years ago.

Figure 2 shows the condition of a wall at the northeast corner of a house on Granville Street, Vancouver, which had been covered with tar eighteen months.

Figure 3 shows the condition of the wall at the northeast corner of the Metropolitan Club Building at Vancouver, which was covered four years ago with Cabot's Brick Preservative.

WITH THE BUSY.

WALDO BROS. will furnish Hoffman and Portland cement for two sections of the Metropolitan Water Works at Northboro, Mass.

WALDO BROS. will furnish the architectural terra-cotta on the following contracts: Pope Building, Columbus Avenue, Boston, Peabody & Stearns, architects; J. W. Bishop & Co., contractors. Bank Building, Newton, Mass., W. G. Preston, architect; H. F. Ross & Co., contractors.

THE NEW JERSEY TERRA-COTTA COMPANY is now working on the terra-cotta for four residences in West 77th Street, of which C. P. H. Gilbert is the architect and Harvey Murdock the builder.

This company has received the contract for supplying the terra-cotta work for Phœnix Mutual Life Insurance Building at Hartford, Conn., Cady, Berg & See, architects; office building, 708 Broadway, New York, Cleverdon & Putzel, architects; Polish Catholic Church, Brooklyn, Angell & Higginson, architects.

THE PENNSYLVANIA ENAMELED BRICK COMPANY has just completed the interior lining of enamel brick approach to Brooklyn Bridge, New York City side, and are now delivering a large quantity of about 50,000 enameled brick for the lining of interior of stable for Commodore Gerry, 62d Street and Madison Avenue, New York City; architect, Alfred Zucker, New York City.

They have also just completed a large order for enameled brick to be used in the Pennsylvania Hospital, corner 8th and Spruce Streets, Philadelphia, Penn.

THE NEW YORK ARCHITECTURAL TERRA-COTTA COMPANY has secured the following important contracts, and are now engaged upon the work:—

The Central Syndicate Building, corner of Broadway and Pearl Street, New York, Mr. John T. Williams, architect.

The Hamilton Club Building, Paterson, N. J., Mr. Chas. Edwards, architect.

Five residences on the upper west side, New York, Messrs. Thom & Wilson, architects.

The Pavilion Building, Tremont Street and Pemberton Square, Boston, Messrs. Burr & Sise, architects, Boston.

THE WHITE BRICK AND TERRA-COTTA COMPANY, New York, has just completed the terra-cotta for residence 718 Fifth Avenue, architects, Jardine, Kent & Jardine; six residences on East 82d Street, New York, architect, Mortimer P. Thain; and have, during the last month, closed the following contracts: four apartment houses, 124th Street, near Eighth Avenue, architects, Thom & Wilson; store and lofts, 51 West 3d Street, New York, architect, Louis Korn; Bank at Flushing, L. I., architects, W. J. Wallace and S. E. Gage; Coe Building, 636–638 Broadway, New York, architect, George B. Post; St. Paul's Church and Parish House at Rochester, N. Y., architects, Heins & LaFarge; store building, 78 Fifth Avenue, New York, architect, Albert Wagner; and store and lofts, 84–90 Van Dam Street, New York, architects, De Lemos & Cordes.

THE PERTH-AMBOY TERRA-COTTA COMPANY will furnish the architectural terra-cotta on the following contracts:—

New York Athletic Club, southeast corner 59th Street and Sixth Avenue, New York City, W. A. Cable, architect.

Building for Joseph P. Smith, Baltimore, Md., Joseph Evans Sperry, architect.

Residence for Louis Dreyer, Paterson, N. J., C. J. Post, architect.

Dwelling for D. C. Phillips, Washington, D. C., Hornblower & Marshall, architects.

Warehouse, 49 West 13th Street, New York City, Clinton & Russell, architects.

Building for Arbuckle Bros., Water Street and Old Slip, New York City, Frank Freeman, architect.

Engine house, No. 20, Baltimore, Md., Geo. C. Haskell, architect.

Dormitory for Catholic University, Washington, D. C., L. Norris, architect.

Office building for Queen's Insurance Company of America, northeast corner William and Cedar Streets, New York City, Harding & Gooch, architects.

Coatesville School, Coatesville, Penn., A. W. Dilks, architect.

Lindner Building, Clifton Springs, N. Y., J. Mills Platt, architect.

Church, Fitchburg, Mass., H. M. Francis, architect.

Library, Newbury, Vt., H. M. Francis, architect.

STEPHEN COOPER & Co., Philadelphia, manufacturers of artificial marble and workers in clay, ornamental plaster, and metals, report a thriving business, and judging from the following list of contracts, which they report having supplied or are supplying, it is evident that they have not felt the existing depression in business to any extent.

ORNAMENTAL PLASTER WORK AND MODELING.

BUILDING.	ARCHITECT.
Broad Street Station, Philadelphia,	Furness, Evans & Co.
Steamship "St. Louis,"	" " "
" "St. Paul,"	" " "
Ferry-boat "New Jersey,"	" " "
" "Camden,"	" " "
" "Pittsburg,"	" " "
Residence for A. J. Cassatt, V. P. Penn. R. R. Co.,	Furness, Evans & Co.
Merion Cricket Club House, Haverford, Penn.,	" " "
Reading Terminal, Philadelphia,	Wilson Bros. & Co.
Residence for J. H. Converse, Rosemont, Penn.,	" " "
University of Vermont, Burlington, Vt.,	" " "
Horticultural Hall, Philadelphia,	F. M. Day & Bro.
Church, 17th and Spruce Streets, Philadelphia,	" "
Residence for Potts estate, Wyebrook, Penn.,	T. P. Chandler.
Bank of Pittsburg, Pittsburg, Penn.,	Geo. B. Post.
Prudential Insurance Company Building, Newark, N. J.,	" "
Residence for Daniel Baugh, President Art Club, Philadelphia,	Hazlehurst & Huckle.
Art Club, Philadelphia,	F. M. Day & Bro.
Siegel, Cooper & Co. Building, New York City,	De Lemos & Cordes.

NATURAL AND ARTIFICIAL MARBLE.

Hotel Bellevue, Philadelphia,	John T. Windrim.
Real Estate Building, Buffalo, N. Y.,	Green & Wicks.
Siegel, Cooper & Co. Building, New York City,	De Lemos & Cordes.
Flats, 58th Street and 6th Avenue, New York City,	Horgan & Slattery.
St. James Hall, Philadelphia,	Rankins and Kellogg.
Mercantile Club, Philadelphia,	Baker & Dallett.
Residence for H. S. Jeanes, Philadelphia,	Robert Stulb.
N. Y. C. & H. R. R. R. Co. Station, Syracuse, N. Y.,	B. L. Gilbert.
Jefferson County Bank, Watertown, N. Y.,	J. W. Griffin.
Hotel Jefferson, Richmond, Va.,	Carrere & Hastings.

TREASURY DEPARTMENT, Office Supervising Architect, Washington, D. C., August 5, 1896. SEALED PROPOSALS will be received at this office until 2 o'clock P. M. on the tenth day of September, 1896, and opened immediately thereafter, for all the labor and materials required for the stone and brick masonry, terra-cotta work, iron work, roof covering, skylight, etc., for the superstructure of the United States Post-Office Building at Buffalo, N. Y., in accordance with drawings and specifications, copies of which may be had at this office or at the office of the superintendent at Buffalo, N. Y. Each bid must be accompanied by a certified check for a sum not less than two per cent. of the amount of the proposal. The right is reserved to reject any or all bids, and to waive any defect or informality in any bid should it be deemed in the interest of the Government to do so. All bids received after the time stated will be enclosed in envelopes, sealed, and marked, "Proposal for the Superstructure and Roof Covering of the United States Post-Office, Buffalo, N. Y.," and addressed to WM. MARTIN AIKEN, Supervising Architect.

HERE IS ONE

Representation of a FIREPLACE MANTEL. Our Sketch Book, containing 39 others, will be sent you on application.

JUST THE THING

FIREPLACE MANTELS MADE OF MOULDED BRICK

In such Colors as Red, Cream, Buff, Pink, Brown, and Gray. These Mantels cost no more than other kinds, but are far better. They are easily set, and have a richness and simplicity of effect which is decidedly pleasing.

PHILA. & BOSTON FACE BRICK CO.,

No. 4 LIBERTY SQUARE, BOSTON, MASS.